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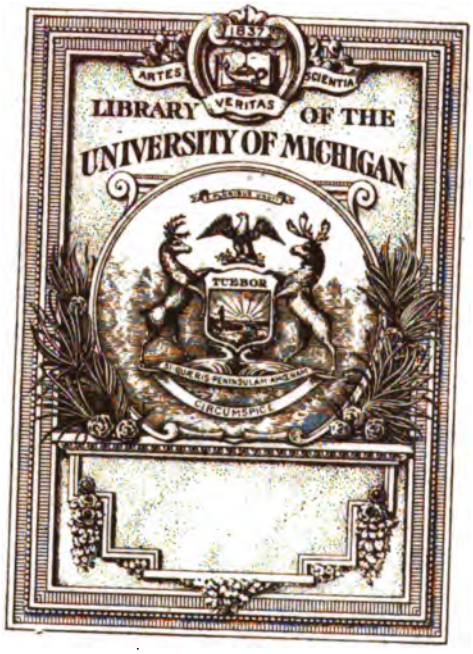
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OCTOBER, 1915—OCTOBER, 1916

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1916

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TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, October 13, 1915

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

TECHNICAL IMPROVEMENT IN LANGE'S COLLOIDAL GOLD TEST. FORMALDEHYDE VAPOR METHOD, AND REPORT OF THREE CLINICAL CASES.

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In May, 1913, Miller and Levy published in the Johns Hopkins Bulletin the technic of Lange for making colloidal gold and the reaction of colloidal gold on the spinal fluid in a series of cases. Some proteids whose exact composition and quantity are not known are found in the spinal fluid in paresis, cerebrospinal syphilis, and in non-specific meningitis in different amounts. They have, however, a rather characteristic reaction with colloidal gold. This test has been made in the State Psychopathic Hospital in a number of cases this last year. The application of this promising test is seriously hampered by the difficulty of the preparation of the essential reagent. This has led to an attempt to devise a method of preparation of colloidal gold simple enough to find a place in a clinical laboratory and sufficiently reliable to give the test the importance it deserves.

The technic of the original method is as follows: Only chemically clean Jena glassware is to be used. The water must be freshly double distilled. To 500 cubic centimeters of water at 60 degrees C. are added 5 cubic centimeters of a 1 per cent. solution of gold chloride and 5 cubic centimeters of a 2 per cent. solution of potassium carbonate. At 96 degrees C. are added 5 cubic centimeters of a 1 per cent. solution of formaldehyde solution. The solution must be a clear red with a blue tinge, not cloudy or yellow. The test is made by making dilutions of spinal fluid in 0.4 per cent. salt solution, 1 cubic centimeter in each of ten test tubes, at a strength of 1:10, 1:20, 1:40, 1:80, 1:160, 1:320, 1:640, 1:1280, 1:2560, and 1:5120, with a control of salt solution without spinal fluid. Five cubic centimeters of colloidal gold solution is then added to each tube. The test is read by the degree of decolorization: 0, is the original red as in the control; 1, is red-blue; 2, is lilac or purple; 3, is blue; 4, is pale or grey blue, and 5, is colorless. Twenty minutes is sufficient to make the test, and the results read in a few hours. The test is interpreted by the zone of decolorization. In general paralysis the first five tubes are completely decolorized, the sixth, seventh, and eighth tubes show decreasing amounts of decolorization, and the last two tubes remain unchanged. (See Fig. 1, Chart 1). In the "luetic zone." the maximum decolorization is in the third or fourth tubes, and is only partial, i. e. purple or blue, not clear. (See Fig. 1, Chart 2). In non-specific meningitis the maximum decolorization is in the sixth and seventh tubes, and is only partial. (See Fig. 1, Chart 3). The test is recorded either by a graphic or curve, where the ordinate represents the dilution of spinal fluid and the abcissa represents the degree of decolorization, or it is recorded by numbers where the position of the integer indicates the dilution and the value of the integer indicates the degree of decolorization.

In making the colloidal gold solution many laboratory workers have encountered much difficulty in getting a clear solution. The sources of error are many and are hard to eradicate. The gold chloride and the potas-

sium carbonate may be purchased chemically pure, and being solids they will keep indefinitely without change of strength; solutions of them may be made up as needed. On the other hand, the formaldehyde is purchased as formalin, 40 per cent. formaldehyde solution, but because this is a solution of a volatile gas it decreases in strength with time and with usage, and some polymerization occurs. A bottle half full after being in the laboratory a few months has not the exact composition that it had when it was made by the manufacturer. Hence 5 cubic centimeters of a 1 per cent. solution of formalin has not a constant amount of formaldehyde, nor is the degree

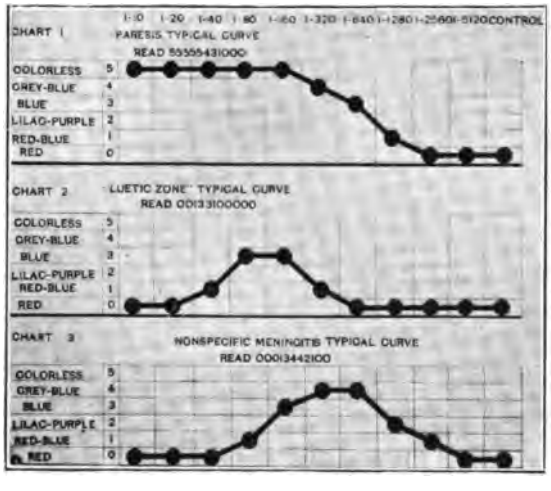

Fig. 1. Typical curves, colloidal gold.

of variability practically measurable. An added disadvantage in the use of formaldehyde in solution is that the reaction can not be controlled because the fluid being added by drops flows in irregularly and sometimes with the last few drops a precipitate or a too deep color appears. Beside the uncertainty of the actual amount of formaldehyde added to the gold and carbonate solution with the danger of excess, there is another and more important objection to the use of dilute formalin. The water used in making the 1 per cent. gold chloride solution, the water used in making the 2 per cent. potassium carbonate solution, and the 500 cubic centimeters of water used to make the colloidal gold is all freshly double distilled to reduce its ionic conductivity. The water in which the stock (40 per cent.) formaldehyde is kept is not so pure, having been in lead glass and exposed to detritus from the cork and from the air. If this relatively impure water is added to fresh double distilled water in making the 1 per cent. solution of formaldehyde, many and unknown variable impurities are added to the reaction.

To obviate the impurity of using formalin, and accepting the volumetric inexactitude of formaldehyde provided the reaction could be otherwise controlled, it was decided to use formaldehyde vapor to change the gold from the form of gold chloride to colloidal gold. Heating the formalin to liberate the formaldehyde as by fractional distillation and to carry it over through a tube into the "gold-carbonate" solution was not satisfactory because the vapor pressure of formaldehyde without steam had not force enough to cause the gas to bubble up through the "gold-carbonate" solution. Heating the formalin to produce formaldehyde gas and steam and letting these bubble up through the "gold-carbonate" solution carried over too many impurities from the water of the stock solution of formalin. Also, some of the vapor condensing in the tubes became strongly concentrated formalin, causing the reaction to proceed irregularly and often to failure. Inserting a condensor, such as a cold water jacket, made the apparatus too cumbersome for practical use in a research laboratory, although it might be satisfactory in commercial work on a large scale. The apparatus eventually devised is small, simple, easily set up and cleaned, and uniformly gives excellent results. Air from a foot bellows is pumped through the rubber tubing to a glass tube, the lower end of which is immersed two or three inches into formalin in a sealed container with a double perforated stopper. The air bubbling up through the formalin becomes charged with formaldehyde gas. The polymers are left behind. The air and gas pass through a large tube half filled with anhydrous calcium chloride and stoppered at each end with cotton and a perforated cork. The air and gas come through free from water vapor and free from mechanical impurities such as might be introduced through the bellows. (See Fig. 2).

To 500 cubic centimeters of freshly distilled water are added 60 degrees C., 5 cubic centimeters of a 1 per cent. solution of gold chloride and 5 cubic centimeters of a 2 per cent. solution of potassium carbonate, as in the original method. This "gold-carbonate" solution is then heated almost to boiling and is kept over a flame because the air bubbling through it tends to cool it. The formaldehyde gas in air is then passed through it and is controlled by the action of the bellows. The solution gradually turns from water-white to a pale blush, then to a

pink, then to a darker red with a bluish tinge. The bubbling causes sufficient agitation in the solution to keep it well mixed all the time. If the reaction is continued too long, the color turns to a dark purple or to a muddy blue. In this modification of the method of preparing colloidal gold no attempt is made to measure the amount of formaldehyde, but the reaction is guided by the color of the solution. Such solutions of colloidal gold are uniformly clear.

As illustrative of the reaction three cases at the State Psychopathic Hospital are presented. First case, Mrs. J. No. 2687, age 53. Twenty-nine years ago a sore on each cheek appeared which extended until they involved the whole nose and part of the upper jaw. She was treated

Fig. 2. Apparatus for making colloidal gold by formaldehyde vapor.

for lupus. There was a great loss of tissue with consequent deformity and much cicatrical tissue formation. (See Figs. 3 and 4). The history of this woman is not complete. A month before admission into the Hospital she had an attack during which she was unconscious, there was foam at the mouth, and the arms jerked and were very stiff. The attack lasted about ten minutes. Four days before admission there were two other attacks during which the eyes were rolled up and the arms were stiff. Two days later she had a series of attacks lasting a few hours; she covered her face or looked strangely at her husband, screamed and talked of being made of fragile glass, then remarked that that was all foolishness. These attacks showed unclearness of consciousness and fan-

Fig. 3. Case 1. Destructive gummous syphilid of the face and nares.

Fig. 4. Case 1. Destructive gummous syphilid of the face and nares.

tastic ideas with experiences resembling visual hallucinations, marked apprehension, and with yelling and disturbing the neighborhood.

The patient was referred to the Clinic of Der-

matology from which the following report was received: "A most extensive destructive lesion as the result of a gummous syphilid of the face and nares. There is considerable active process in the throat together with marked cicatrization as the result of an ulcerative syphilid in this region. An unusual feature of the case and of especial interest is the association of central nervous manifestation, as it is unusual to find this malignant type of syphilis associated with the late sequela of the nervous system."

From the Clinic of Otolaryngology the following report was received: "Marked depressions of the nose, external structures of which are intact. The throat shows rather thickened soft palate over which there is superficial ulceration; the tonsillar region, markedly injected and reddened pillars. Nasopharynx shows no evidence of bone destruction. We feel that there is no destruction of the bone at the base of the skull, but this could be verified only by X-ray examination because the interior of the nose and the epipharynx is scar tissue."

The X-ray Department reported "The definition of these plates is very imperfect, partly because of the patient's movement and partly because there is erosion of certain other structures with sclerosis of the remainder entirely destroying the usual anatomic landmark. No diagnosis."

The further physical examination also showed large scars of old healed gummata on the face, left axilla, right breast and on the buttocks, large quantities of a tenacious yellow and green substance raised by coughing, negative lung and heart findings, no adenopathy, and neither liver nor spleen enlarged.

The sense of smell was totally lost, pupils were fixed to direct and consensual light stimuli but they reacted in accommodation; generalized hypalgesia, arm reflexes increased and equal on the two sides, knee jerks much increased and equal, Achilles increased and equal, no Babinski, no Romberg, no clonus, fine tremors of the extended fingers and of the protruded tongue but not of the lips, and some inco-ordination in the finger to finger, finger to nose, and heel to knee tests. The fundus was negative.

The laboratory examinations were as follows: Urine negative. Blood count, reds 5,320,000; whites, 17,500; hemoglobin 75 per cent. The blood was four plus Wassermann. The spinal fluid was four plus Wassermann, 14 cells per cmm., Nonne-Apelt 5 plus, Nissal-Esbach 2.2 and the Alzheimer clot showed of 212 cells counted 89.2 per cent. lymphocytes including some tailed forms, 4.7 per cent. large mononuclears, 4.3 plasma cells, 0.4 reds and 1.4 epitheloid cells. The colloidal gold curve was 0013331000. (See Fig. 5, Chart 4).

While in the Hospital she had no motor attacks. She described her former attacks as like a nightmare. "We have had warnings before any of my family died. Before I was brought here I was struck for death like the frost touches the buds: something cold touched my feet like the Angel of Death. I saw some strange things, crazy like, as if we were made of glass and the thunder and lightning were going to blow us to pieces. I disturbed the neighbors by yelling. Then I'd come to myself and say, 'How foolish, for we've always been made of flesh.' My life has been very hard.

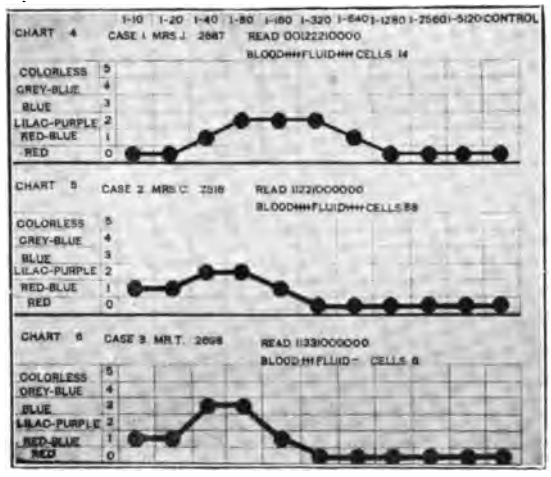

Fig. 5. Colloidal gold curves in cases 1, 2 and 3.

I suppose I'll be ready to die. I'll pray. If my time has come, He will help me pass the dark river." Her grasp was always clear. She was correctly oriented in the three spheres. She had the cheerfulness of resignation and relief, but she was not euphoric. She had remarkably good insight. There was no defect in the memory. There was no apparent deterioration.

In this case the diagnosis was syphilis, probably unlocalizable extension of the gummatous process involving the deep tissues of the face. The colloidal gold reaction was that which is so commonly found in cerebral syphilis, namely, the maximum decolorization in the luetic zone. She was transferred to the Clinic of Dermatology and later was discharged to the Social Service Department.

Second case was that of Mrs. C., age 47, No. 2516. Since she was 42 she has had many hys-

terical complaints, especially a pain in the head suggesting clavus hystericus, attacks of feeling numb and aphonia, but no convulsions. There were many mild paranoid ideas based on suspicion. She once complained of one side of the face being poisoned by soap. She was jealous and suspicious of her husband and her interests always have been self-centered. She has always shown unusual pride and ambition. She entered the Hospital the summer of 1914. At that time the physical examination showed a slight adenopathy, anemia, chronic rhinitis, left eye slightly lower than the right and a slight ptosis of the left upper eyelid; tongue protruded to the left; enlarged median lobe of the thyroid; heart and lungs negative, and an atrophic retroverted uterus.

Neurologic examination showed markedly diminished bone conduction deafness; extra-ocular movements normal except failure in convergence, pupils eccentric and sluggish, conjunctival anesthesia, pharyngeal reflex absent, marked ovarian and inframammary tenderness, coarse tremors of the extended fingers, tendon reflexes present and equal on the two sides, no clonus, no Romberg, no Babinski.

The laboratory examination showed urine negative, secondary anemia, and negative Wassermann on the blood. She complained of loss of memory and inability to concentrate. Her deafness and her lack of co-operation prevented a thorough examination. A diagnosis of conversion hysteria was made and the patient discharged.

In the interval at home she never was entirely well. Two weeks preceding re-admission in 1915 she had temporary sharp pains in the eyes. There rapidly developed a complete ptosis of the left upper eyelid which she said followed directly after an unhappy experience. Having passed the menopause she realized she could have no more children. She had become interested in the little daughter of a workman and had taken the child to a dispensary where the physician had said the girl would lose the left eye. Examination showed the hearing more diminished in the left ear than in the right, the tongue had no tremors but protruded to the left, reflexes all increased, no Babinski, left exophthalmus, very little left extra-ocular movement, left pupil smooth in outline and 5mm. in diameter, no reaction in the left pupil to direct and consensual light stimuli nor in accommodation, no disturbance in vision in the left eye when the lid is raised if the right eye is covered, and diplopia if both eyes used, and no nystagmus.

The Wassermann reactions on the blood serum of this case, as reported by Dr. Sobei Ide, are as follows:

7-23-14	Negative	—
4-16-15	Doubtful	+
5- 1-15	Four plus	++++
6-25-15	Doubtful	+
9-22-15	Two plus	++

The Wassermann reactions on the spinal fluid are:

4-16-15	Two plus	++	(not dependable—bloody)
4-26-15	Four plus	++++	
4-30-15	Four plus	++++	(bloody)
6-16-15	Negative	—	
9-24-15	Negative	—	
6-25-15	Doubtful	+	

The globulin and the total albumin always were increased as shown by the Nonne-Apelt and Nissl-Esbach tests. The cell count, when the spinal fluid was not contaminated with blood was 5-1-15, 88; 6-24-15, 13; 9-27-15, 6. The differential count of the cells by the Alzheimer clot method on 6-24-15 was in 205 cells counted, lymphocytes including both transitional and tailed forms 80.5 per cent, large mononuclears 0.8 per cent., plasma cells 6.7 per cent., epitheloid cells 1.0 per cent., macrophages 1.0 per cent., polynuclears 1.0 per cent. and fibroblasts 1.0 per cent. The colloidal gold reactions were as follows: 5-1-15, 11112220000; 6-15-15, 11221100000, 6-24-15 11221000000 (See Fig. 5, Chart 5) and 9-27-15, 00000000000.

She was very disinterested on re-admission. There was no insight, hence the medical attentions given her were regarded as superfluous. She did not co-operate, and her carelessness caused innumerable mistakes. She was irritable and stubborn. There was no defect in perception and she was oriented for person and place. There was a marked defect in retentive memory with consequent disorientation for time. No speech defect. Parallel speech was observed. She was expansive and euphoric, calling herself perfectly well and happy, and the great woman inventor. There was a childishness in her reaction to incarceration, sulky and mischievous. She never was stuporous here but told of former fainting spells. There was an element of simplicity in her thought and marked defect in her judgment. She complained of headaches in the right parietal region. She failed to respond to suggestion. She was given potassium iodide by mouth and mercury by inunction. Her mood was variable, usually she showed euphoria and intermittent irritability. As her physical condition improved and the

[illegible] the remained pendant and [illegible] and the [illegible] [illegible]. There was a [illegible] [illegible] which tended to produce the impression which [illegible] [illegible] the [illegible] Meningitis [illegible] [illegible] [illegible] Meningitis. Meningitis? There was a paralytic trend in the [illegible] of tongue and lips [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]. After two [illegible] of [illegible] [illegible] [illegible] [illegible] showed a marked improvement. The memory [illegible] disappeared. She was [illegible]. There was no more irritability. She never [illegible] [illegible]. The [illegible] and the paralytic trend persisted. She was discharged improved. This case was diagnosed cerebrospinal, gummatous meningitis type. The colloidal gold reaction was that desired in cerebrospinal as differentiated from paresis, and resembled that of the first case.

The third case is Mr. T. No. 2695, age 54. The father died at 83 of spinal meningitis and the mother at 68 of apoplexy; the family history is otherwise negative. He used alcohol moderately and tobacco to excess. He had heart and kidney trouble for twenty years. Three years ago he had severe pains in the left arm and in the left leg, and the use of these extremities was impaired. The diagnosis at that time was neuritis. In August, a year before admission, he fell unconscious on the street but no paralysis resulted. The diagnosis then was sunstroke. Within four days he was apparently normal and the pain in the left arm was gone. In September, a month later, he had a stroke of apoplexy after which he was unclear and stuporous for two weeks and dazed for the ensuing two weeks; he had difficulty in swallowing or speaking and the left side was paralyzed. In December he had an attack in which he was very unclear and stuporous for two weeks. He was dyspneic especially at night. He remained dazed until March when his condition improved. In April he had some heart attacks in which he had respiratory trouble and was delirious for short periods. Since then he has never had clear consciousness, but the degree of clouding was very variable.

The physical examination showed emaciation, anemia, marked arcus senilis and sclerotic radial arteries, generalized adenopathy, hypertrophy of the left ventricle and myocardial changes; apex two finger breadths beyond the nipple line in the fifth intercostal space, apex beat forceful and heaving but without systolic retraction, no [illegible] [illegible] at the base a soft blowing systolic murmur over the [illegible] [illegible] transmitted to the base. [illegible] second sound was accentuated, the second heart sound was accentuated in the third interspace but no murmur was heard there, a soft blowing systolic murmur in the tricuspid region that replaced the first sound; the second tricuspid sound was accentuated; at the apex there was a soft blowing systolic murmur which had at times a musical quality which was poorly transmitted; the second sound at the apex was followed by a muffled third sound in early diastole; the blood pressure in two readings a week apart was systolic 0, diastolic 140, and systolic 150, diastolic 130. The fundus showed advanced arterial sclerotic changes, edema of the retina and retinal hemorrhages in both eyes.

The neurologic examination showed the pupils to be irregular in outline and their reaction very slow and limited to direct and consensual light stimuli and in accommodation; a generalized hyperalgesia; no tenderness on deep pressure over the nerve trunks; atrophy of the small muscles of the left hand with paresis of the first finger, no change in sensibility in the left hand, left hand grasp diminished, left wrist drop, intention tremors especially in the left hand, tendon reflexes all increased especially on the left side, in fact the neuromuscular irritability was so marked that tapping any of the muscles of the face or arms caused a visible contraction, no clonus, positive Romberg, and no tremors of the tongue and lips.

The urine was negative. No casts, no albumin, urea high normal, 0.489 urea per liter. The blood count was reds 4,480,000; whites, 12,800, of which 78 per cent. were polynuclears, 18 per cent. mononuclears, 2 per cent. eosinophiles and 2 per cent. mast cells; the hemoglobin was 85 per cent. The Wassermann reaction on the blood serum was three plus (+++). The Wassermann on the spinal fluid on June 16 was negative, with six cells. Nonne-Apelt 2, and Nisel-Esbach 2.0. However, the colloidal gold reaction was 113200000. (See Fig. 5, Chart 6). The maximum decolorization being in the luetic zone was diagnostic of cerebral syphilis, the negative Wassermann to the contrary. Therefore a week later another rachicentesis was performed. The results this time were Wassermann two plus (++), cells 3, Nonne-Apelt 5+, Nissl-Esbach 1.8, colloidal gold 1121100000, and the Alzheimer clot showed of 100 cells counted.

Lymphocytes 65.8 per cent. including tailed, disintegrated and transitional forms.
Large mononuclears 25.2 per cent.
Plasma cells 1.1 per cent.
Epithelioid cells 1.1 per cent.
Macrophagus 1.1 per cent.
Red corpuscles 2.1 per cent. These were old disintegrating forms.
Fibroblasts 1.1 per cent.
Polynuclear leucocytes 2.5 per cent.
One section showed a mass of old blood pigment that looked like a fragment of an organized clot.

A third lumbar puncture was done five days later for diagnostic purposes and to give intradurally a provocative dose of salvarsan (0.33mg.) The Wassermann was two plus (++), cells 6, and the colloidal gold was 11221100000.

The first two weeks of residence in the Hospital he was delirious. He was slightly disoriented. "Everything is yesterday." There was an unquestionable progressive memory defect. There was romancing and confabulation. The third week the delirium became more severe, the dyspnea was more marked and he was apparently moribund. He improved under digitalis. He became excited and untidy. August 25 he failed in strength, became stuporous, respiration Cheyne-Stokes, and on August 29 died.

The diagnosis was cerebrospinal syphilis, vascular type; syphilitic psychosis.

Post mortem showed the following gross pathology: edema of the extremities; heart greatly enlarged on the left side, left ventricle distended with coagulated blood, marked hypertrophy of the left ventricular walls, aortic ring dilated causing leakage of the aortic valve, cusps of the aortic valve not sclerosed, aorta enlarged between the heart and the arch and showing many thickened patches not calcified though the endothelium was ragged and denuded in patches giving a "moth-eaten" appearance; pericardial fluid much increased and of a greenish yellow color; cicatrical contractions and adhesions of the apices of both lungs, lungs well distended with air and showing no edema; all abdominal organs congested; in the head there were patches of pachymeningitis, calcified pacchionian attached to the dura; cerebrospinal fluid was so greatly increased that about eight ounces of fluid and semi-clotted blood were removed from the fossae and a large amount of clotted blood from around the base of the brain.

The microscopic pathologic findings were:

Lung.—Purulent bronchopneumonia. Chronic passive congestion. Areas of complete atelectasis. Chronic pleuritis.

Heart.—Perivascular thickening. Sclerosis of coronary moderate. Fatty infiltration subepicardium.

Bronchial Nodes.—Heavily pigmented.

Aorta.—Syphilitic aortitis. Atherosclerosis. Calcification. Thrombosis of vasa vasorum.

Spleen.—Chronic passive congestion. Atrophy. Sclerosis of arterioles.

Kidneys.—Early stage of syphilitic arteriosclerotic kidney involving outer layer of cortex. Repeated healed infarction. Passive congestion. Sclerosis of smaller arterioles. Areas of recent infarction. Some portions show the appearance of a secondary contracted kidney. Numerous hyaline casts. Syphilitic endarteritis.

Liver.—Brown atrophy. Chronic passive congestion.

Pancreas.—Slight atrophy. Sclerosis of vessels. The main pancreatic branch of the splenic shows a marked atherosclerosis with an organizing thrombus partially obliterating the vessels. Some islands of Langerhans are hypertrophic. Localized fatty necrosis throughout the gland.

Adrenals.—Marked lipoid degeneration. Thickening of capsule.

Testis.—Small patches of syphilitic orchitis fibrosa. Majority of tubules show spermatozoa.

Pathologic Diagnosis. — Acute purulent bronchopneumonia. Old syphilis. Active latent syphilis in aorta and kidney. Syphilitic aortitis. Syphilitic endarteritis in renal arteries. Early syphilitic arteriosclerotic kidney. Chronic parenchymatous nephritis. Syphilitic orchitis. Atrophy and passive congestion of all organs. General arteriosclerosis. Organized thrombus of pancreatic artery.

The neuropathologic examination was made by Dr. Albert Barrett who reports:

Brain hardened in 10 per cent. formalin. The form is well preserved. Consistency is firm. Pieces have been removed from frontal and central regions.

The brain has a length of 7.4 cubic centimeters and breath of 14.2 cubic centimeters.

The piamater is clear and thin except over the posterior part of both Frontals, along the longitudinal fissure, streaks of haziness extending from here for a few centimeters above the sulci. The pia is collapsed into the sulci. The

pia over the cisterna is clear. The right olfactory bulb is torn away.

The second and third nerves stand out clearly and show no gross alteration. The other nerves at the base are buried in a diffuse hemorrhage in the arachnoid, which is spread over the inferior surface of the medulla and the cerebellar-pontine angle. Both vertebrals and the basilar show longilar thickenings and small yellow thickenings along their course. There are ring-like thickenings through the carotids and anterior cerebrals. Section through one of these in the left vertebral shows a thickened wall and narrowed lumen. The branches of the basal arteries show small longilar thickenings. Some of the arteries of the pia show scattered yellow thickenings. Others are quite normal in appearance.

Longitudinal section through the middle of the thalamus shows a small softening in the left lenticular nucleus. There is a marked difference in the way the posterior horns extend into the occipital region. On the left side the posterior limit of the horn is about 15 mm. On the right side the horn extends four centimeters from the posterior top. The softening in the lenticular nucleus extends one centimeter into the depth.

There are no other focal lesions.

Diagnosis.—Endarteritis, syphilitic. Arteriosclerosis of the basal and pial vessels. Diffuse hemorrhage from pia. Softening of the lenticular nucleus.

CONCLUSIONS.

Colloidal gold made with dilute formalin contains many impurities and often is not a clear solution, but when formaldehyde vapor is used the impurities are eliminated and the solution is clear. Dilute formalin is not of constant amount, polymerization occurs, and the exact amount of formaldehyde used can be only approximated; the formaldehyde by the vapor method is not measurable but the reaction can be controlled by the degree of color changes.

The colloidal gold reaction is a simple and should be a practical test. It is a good check on the Wassermann; sometimes it is more delicate than the Wassermann, and seems to offer a differential diagnosis between general paralysis and cerebral syphilis.

DISCUSSION

Dr. Floyd Earl Bartell: This paper has been exceedingly interesting to me, and I think Dr. Hulbert is to be congratulated upon being able to obtain such clear solutions of colloidal gold. I have had occasion to attempt the preparation of such solutions myself and appreciate what it means. It might be interesting to know something about the properties of the various solutions giving colors such as have been shown here. Zsigmondy a few years ago took up the study of the size of the colloidal particles. The size of the particles of gold such as we see in the beaker before us are probably about ten to fifteen micromicrons in diameter. Colloidal gold, as has been pointed out, is a colloid, irreversible, carrying a negative electric charge. Any electrolyte having positive ions would neutralize it, producing precipitation. In looking at the colors which we have before us, in the red the particles measure about ten to fifteen micromicrons, the red violet fifteen to twenty-five micromicrons, the violet twenty-five to fifty micromicrons, the violet blue about seventy-five micromicrons, the blue about 100 to 130 micromicrons, and the gray somewhat larger. Of course the colorless solution means that the particles have grown to such a size that they have settled out and the solution is practically free from gold. In the case of the bright red solution it means that the particles are of uniform size; this explains the difficulty in producing such solutions. In this work Dr. Hulbert has used sodium chloride. A salt like magnesium chloride should be more effective in changing the color because magnesium with a valence of two, carries twice the electrical charge and probably would be nearly ten times as effective in precipitating gold. Aluminium chloride would be about one thousand times as effective as sodium chloride, aluminum having a valence of three. Of course, it means that with such solutions the gold particles would be made to change from red to blue and the various stages in between. Experiments with such control solutions would be interesting.

As has already been pointed out, we have protective colloids such as gelatin, agar agar and albumin which prevent precipitation. If such colloids were placed in a gold solution we would not get a precipitation unless we had a large amount of salt solution present. Inasmuch as we do get changes from red to blue in the test solution, it shows that the particles are growing. The question then is as to whether the color change and related curve are due to an increase in the quantity of salt, or a decrease in the quantity of the protective colloid. The peculiar thing to me in this table which has just been presented is that as we start to add the spinal fluid the gold remains red, then suddenly changes through the color scale to blue and then goes back to red again. Now if the spinal fluid contains a protective colloid, why doesn't the solution stay red for a longer time, or if it contains something which causes precipitation such as an electrolyte, why should we obtain this second red solution after we have added this greater amount of precipitating solution? Why doesn't it go immediately to blue and remain blue? This surely is an interesting problem from the chemical standpoint.

Dr. David M. Cowie: I think the colloidal gold test will be better understood if it is known that the reaction is based on the principles of colloidal chemistry. There are two kinds of colloidal solutions: reversible and irreversible. Reversible col-

loids are those which leave after slow evaporation a residue which is soluble in water. Such solutions are insensitive to electrolytes, that is, they are not precipitated by the addition of an electrolyte. Dextrin, gelatin, albumins and some albumoses are examples. Irreversible colloids are just the opposite. Their residue is insoluble and they are quickly precipitated by electrolytes. For example if dilute hydrochloric acid is added to this solution the red color will quickly turn to blue and a fine deposit of gold will begin to be thrown down.

If a reversible colloid solution is added to an irreversible colloid solution in proper proportion it protects the latter in such a way that the electrolytes have no effect upon it. Accordingly such colloids are called protective colloids. For example if so small amount of gelatin (a protective colloid) as 0.0001 per cent. is added to this red colloidal gold solution the addition of an electrolyte will produce no change in its color or in its physical constitution and should it be evaporated its residue will now dissolve in water.

Each reversible colloid has what is known as its gold figure which is specific, that is, it may take a lower dilution of one than another to protect. Certain albumoses, synalbumose, change colloidal gold to a blue color without the presence of an electrolyte, (NaCl in this test). The luetic process elaborates a different substance or a different quantity of it than some other process at work in the cerebrospinal system.

I became very much interested in this test sometime ago, but from the same source Dr. Hulbert got his inspiration to go ahead with the test I got my inspiration to stop. It was then thought by the Johns Hopkins workers that the test was of no practical value over other tests. Recently some work has been done which seems to show that the test may be of some greater value. These colloidal substances are of interest to pediatricians because they take cognizance of them in infant feeding. In milk we have lactalbumin, a reversible colloid, and casein, an irreversible colloid.

Dr. James G. Van Zwaluwenburg: Although I am not familiar with the colloidal end of the reaction, it strikes me that the proposed modification of the method of preparation of the colloidal gold is eminently rational and simple. Formaldehyde is an unstable product. We know of at least four condensation products which are bound to occur in a bottle which is not full. Naturally the simplest thing is to use pure formaldehyde vapor provided that the end reaction can be properly controlled. The end reaction as demonstrated is very clear. It seems to me, as Dr. Hulbert has said, that it promises to give the test its place in clinical medicine which it rightly deserves.

Dr. Udo J. Wile: I should like to say that there is a practical bearing to Dr. Hulbert's paper that may not have been apparent to everyone. The cases of general paresis that are usually diagnosed as such are easy of diagnosis. So also are the cases of frank cerebrospinal syphilis. There are a number of cases, however, in which the most careful neurologic examination fails to establish a differential diagnosis between general paresis of an aberrent and an unusual type and cerebrospinal syphilis. Now when one considers that a patient with general paresis is no longer responsible and that he may be holding positions of trust and that a certain degree of watchfulness over his affairs is necessary after a diagnosis has been made, and that such care does not have to be exercised in cases of cerebrospinal syphilis, any test which would differentiate those two conditions is worthy of the greatest study and commendation. The colloidal gold test as first described was not satisfactory for the reason that the colloidal gold was a very doubtful quantity. If he has by his method eliminated this doubtful factor in diagnosis, I think Dr. Hulbert has made a very distinct advance.

Dr. Hulbert: In the third case, the man who died, when we got a 3+ Wassermann on his blood, the Wassermann on his spinal fluid was negative. We did a colloidal gold test on the spinal fluid and got this chart as described here.

In our cases, so far about sixty, we have never yet found a case where the colloidal gold test did not agree with the diagnosis that we otherwise made. So in spite of the negative Wassermann at that time, we punctured this man again and at this time we got a 2+ Wassermann and the Alzheimer clot agreed with cerebrospinal syphilis.

It will be our pleasure through the next year to do the colloidal gold test on any samples of spinal fluid sent to us from this Hospital or others which will send us spinal fluid for examination.

THE EFFECT OF POTASSIUM IODIDE ON THE LUETIN REACTION.

John W. Sherrick, B.S., M.D.

Resident Obstetrician and Gynecologist, University Hospital, Ann Arbor, Michigan.

In the *Journal of the American Medical Association,* July 31, 1915, I published a preliminary report on the effect of potassium iodide on the luetin reaction. At this time I wish to bring to the attention of the Clinical Society further consideration of the same subject and take the liberty of quoting from this article.

During the past year I had the opportunity of studying the luetin reaction somewhat in detail on patients admitted to the Neurologic Service of the University Hospital. As a result of this study it was attempted to determine the value of the luetin reaction in the diagnosis of syphilis, the proper technic and the influence of various factors, such as medication, etc.

Observations were made, sometimes repeatedly, in a series of 235 cases from the Neurologic Clinic, service of Dr. C. D. Camp, for whose kindness in giving permission to use this clinical material, and for whose assistance and many suggestions I am greatly indebted. This reaction was also tested on a series of sixteen cases admitted to the Clinic for Dermatology and Syphilology, service of Dr. Udo J. Wile,

whom I wish to thank for the use of this clinical material.

I wish to thank Dr. Noguchi for his kindness in furnishing the luetin material used in these tests, also Park-Davis & Co., for luetin material furnished. The technic followed is that described by Dr. Noguchi, namely, the intradermal injection of a 1-1 dilution of luetin material with saline. The luetin material consists of a suspension of a number of strains of Treponema Pallidum grown for a period of six, twelve, twenty-four and fifty-six days on ascitic agar and ascitic bouillon at 37 degrees C. and under anerobic conditions. This material is then carefully ground to a paste which is in turn gradually diluted with the fluid until a liquid emulsion is obtained, the emulsion then being heated to 60 degrees C. for one hour and a preservative, trikersol, added. The test as used is claimed to be a cutaneous reaction for the diagnosis of syphilis in the latent and tertiary stages.

The cases were taken indiscriminately and were both luetic and non-luetic. In fact, a large percentage were non-syphilitic from every standpoint, including cases of pernicious anemia, brain tumor, hysteria, traumatic neurosis, muscular dystrophy, sciatica, chronic nephritis, neuritis, epilepsy, Grave's disease, multiple sclerosis, arteriosclerosis, disturbances of the internal secretions, et cetera. The reaction was observed on an average of from eight to ten days and in many for a period of several weeks.

A detailed report of the various factors above mentioned will be deferred to a later communication. In this report I wish to call attention to the influence which potassium iodide has upon the luetin reaction.

The fact that the administration of potassium iodide will cause a positive luetin reaction which otherwise would have been negative in non-syphilitic individuals seems not to have been discovered. Furthermore, the fact that this is indistinguishable from the reaction indicative of syphilitic infection is a matter of considerable importance to those using the luetin reaction as a means of diagnosis. If the patient suspected of being syphilitic has received potassium iodide either before, during, or shortly after the use of the test, the result is entirely unreliable. The fact that the iodides are capable of causing this reaction to the intradermal injection of luetin may throw some light on the pharmacologic action of the iodides.

Where potassium iodide is administered to patients who have undergone a luetin test, it is found that in practically every case a pustular or nodular reaction results; in this series only one has failed to respond. As a rule, relatively large doses are required to bring about this condition, on an average of twenty to thirty grains three times daily, but a great deal apparently depends on the individual's susceptibility, a positive reaction being obtained in several cases with small doses, grains ten, three times daily. This reaction is characterized by a marked areola, with redness, edema and swelling appearing in a very few hours after the injection and gradually increasing in its manifestations. There is a firm, central nodule of a bright red color raised above the surface of the skin and extending deeply; this nodule develops an area of central necrosis which, in turn, is in most cases replaced by a hemorrhagic pustule. The intensity of the reaction varies in different individuals but always goes on to the pustular stage if the drug is continued. This pustule upon discharging soon heals and marks the end of the reaction. If only small doses of potassium iodide be given, or if large doses be given for a short time, and the drug is stopped short of the pustular stage, there is a similar reaction to the iodide but no discharge, and the lesion involutes, to reappear again upon subsequent re-administration of the iodide. This has been demonstrated in several cases, and with proper manipulation I think can be obtained in practically every case.

It is interesting to note that the period elapsing between the injection of the luetin material and the ingestion of the potassium iodide may vary widely with still positive results. In one case with a negative luetin test, potassium iodide was given in small doses some two months later and the old seat of the test immediately developed an areola with a firm, red, central nodule. The potassium iodide was then discontinued and the reaction stopped short of the pustular stage and underwent complete involution. Subsequent administration of potassium iodide several weeks later resulted in a similar response. If potassium iodide is administered at the time of the injection of the luetin an intense reaction develops in from three to eight days. A similar result ensues if the patient has been receiving potassium iodide previously but even more quickly. If, however, the patient has received potassium iodide over a considerable period, but none previous to the luetin test, a positive luetin will still result if too long a time has not elapsed from the time

of the administration of the iodide. In one case a marked reaction was obtained three weeks after the potassium iodide was discontinued.

A reaction similar to the luetin can be obtained by the injection intradermally of other substances, such as agar, starch, et cetera, and administering potassium iodide. The response which agar shows to potassium iodide is more marked even than the luetin material, an intense reaction involving practically the entire surface of the arm resulting. A very thin emulsion of agar, less than 1 per cent. is injected in 0.07 cubic centimeter doses. There is a response without potassium iodide but this, in the course of a few days, involutes if not influenced by potassium iodide. A positive agar reaction with potassium iodide has been obtained by administering iodide some weeks after injecting the agar.

A thin starch emulsion, injected in the same manner, will, under the effect of potassium iodide, give a similar pustular reaction; but as yet it has not been determined the length of time after which such reaction could be obtained. Insoluble substances, of the nature of bismuth, will not give this reaction, nor will vaccines such as the gonococcus vaccine, et cetera.

Another point of note is that the administration of other drugs which contain iodine, such as thyroid extract, will develop a reaction similar to the potassium iodide. Painting the lesion with iodine, however, does not give the reaction.

The effect of the iodides on the luetin reaction has been tested in forty-eight cases, both syphilitic and non-syphilitic, and the results obtained seem to justify the following conclusions:

CONCLUSIONS.

1. A positive pustular or nodular luetin reaction can be obtained in 99 per cent. of all cases irrespective of the presence of syphilis, by the administration of potassium iodide, either simultaneously, or shortly before, or after the intradermal test.

2. Other substances, such as agar and starch, when injected intradermally, will give a similar reaction when potassium iodide is administered, but with these substances the potassium iodide must be administered within a shorter time than is the case with the luetin.

3. Other drugs containing iodine have a similar influence on the luetin reaction.

DISCUSSION.

Dr. Harry B. Schmidt: I would like to ask Dr. Sherrick if he has ever tried tuberculin with iodine.

Dr. Sherrick: I have not.

Dr. D. M. Cowie: I would suggest trying the emulsions of some of the other spirochetes.

Dr. Udo J. Wile: I may say that I had an opportunity of seeing a number of Dr. Sherrick's tests before I knew the nature exactly of the reaction that had been performed, and I said unreservedly in two or three instances which I can remember that the reaction was a typical luetin reaction.

This work is very important and indicates very clearly the relative uselessness of this test as a clinical aid. It was hoped at the start that the luetin test would displace the Wassermann test and place in the hands of the general practitioner a very convenient way of finding out whether a patient had syphilis. Many syphilitics do react to the luetin, particularly those who are in a later stage of the disease. It is claimed that it will show up a syphilitic taint when the Wassermann will not. My first experience with luetin some years ago when it was first advocated, did not convince me that it had any advantage over the Wassermann reaction. I may say too, in regard to the character of the reaction under discussion, it has been suggested, or might suggest itself, that the skin test that Dr. Sherrick has brought out is an iododerma. It looks nothing at all like such a manifestation. Iodine gives rise to a superficial pustule. It never leaves a scar. These lesions look like tuberculides. They leave a little pigmented and atrophic scar and it would seem likely that they are due to some peculiar interaction between the iodide and the tissue itself, irrespective of the spirochete.

Dr. Sherrick: I might add that out of the 235 cases upon which this was tested, there are only two or three that I would say gave a luetin reaction which is described by Dr. Noguchi and other men who have worked with it as typical of the reaction. We are planning this year to carry this work a little further since through the courtesy of Park, Davis & Co. we are furnished with new material in which the spirochete is grown on a new medium not containing agar agar.

PRIMARY CARCINOMA OF THE APPENDIX.

Cyrenus G. Darling, M.D.

(From the Surgical Clinic, University Hospital, Ann Arbor, Michigan.)

Mr. H. L., age 39 years, a student, entered the University Hospital September 8, 1915, complaining of distress in the stomach and vomiting with pain in the epigastrium and lower right quadrant.

The family history is negative as regards carcinoma and lung trouble.

His personal history consists of the usual children's diseases with uneventful recoveries. He had typhoid at 30, but made a good recovery in six months.

His present trouble began about one year ago, since which time every three or four weeks he has had severe headache, sour stomach and loss of appetite. These attacks have never been accompanied by abdominal pain. The last attack similar to the former attacks, began six days before the operation.

Two days before the operation he had severe pain in the right lower quadrant which radiated to the mid line and epigastrium. Pain was present in the right lower quadrant for the first time; there was no temperature until twelve hours before the operation when there was a severe chill followed by a temperature of 100.4 degrees, pulse 118. At eight o'clock the same evening the temperature was 98 degrees, and the pulse 68. A diagnosis of appendicitis was made and immediate operation advised.

The appendix was found free from marked outward appearance of inflammation and except for the club shaped free end probably would not have been considered diseased.

The meso appendix was slightly thickened and the lymphatic nodes were not sufficiently enlarged to attract attention. The appendix was removed in the usual way and when opened showed a cyst-like cavity at the tip one-half by one-quarter inch in size, which was filled with a mucous secretion. This was entirely closed off from the remainder of the canal by a thick barrier of hard tissue. Beyond this point the mucous membrane was very red and congested. The muscular and connective tissue layers were much thickened over the cystic part, but nearly normal over the remainder of the appendix.

According to the usual custom the specimen was sent to the pathological laboratory and Dr. Warthin returned the following report: "Primary carcinoma of the appendix of the type peculiar to the appendix. Infiltration extends into the meso appendix. The prognosis in this type of carcinoma may be considered good as a relatively large proportion of the cases reported have apparently recovered, going for a long time after operation without a recurrence. Such a case we had in Dr. Peterson's clinic some years ago. As the meso appendix is extensively infiltrated, I would advise a second operation with the dissection of the neighboring lymphatic tract and the removal of any mesenteric nodes that might seem enlarged. The prognosis then, I would consider relatively good."

Following the advice of Dr. Warthin a second operation was performed and a careful search made for any enlarged lymphatic nodes. Only two were found, one above the iliocecal junction, and another in the meso appendix. Both were removed. While some of the meso appendix was removed it did not show any change except such as would be seen in the process of repair. The material from the second operation was also sent to the pathologist who reported that lymph nodes showed no metastasis. He considered the prognosis relatively quite good.

The diagnosis of carcinoma of the appendix is rarely made before operation and in this case not until the pathologist examined the specimen.

Emil Ries reports a case found by accident while operating for another condition, and mentions another described by Watkins which had a mucous cyst distending the end of the appendix.

DISCUSSION.

Dr. Reuben Peterson: Not knowing the nature of the case report to be given by Dr. Darling, naturally I didn't look up the case referred to by Dr. Warthin. My recollections of the case, however, are that it was discovered in the same way as was this case, through the routine examination in the laboratory. I think it occurred at the time I was removing every appendix when the abdomen was opened, and that the report came back that this particular specimen showed carcinoma. The patient as I remember was not reoperated upon but whether there has been a recurrence in the case I don't know. With the Society's permission, I will look up the case and add it to Dr. Darling's case report so as to put on record another case of carcinoma of the appendix.

I think the large majority of these cases will be discovered in just this way. Early in the disease there will be no clinical symptoms to enable us to make a diagnosis prior to operation. Late cases will be considered carcinoma of the cecum. It is very fortunate that the lymphatic supply of the appendix is such that extension from the primary focus is usually very slow.

The case referred to by Dr. Warthin was reported by him in the December number of the *Physician and Surgeon*, 1906, under the title: "Primary basal-celled carcinoma of the appendix; Report of a new case with some observations bearing upon its histogenesis."

"The clinical history of the case previous to the operation is without any definite bearing upon the pathologic condition: Mrs. B. G., aged 32, married eight years and has one child, now twenty-two months old. Her trouble began about nine months ago with swelling of the elbow diagnosed as 'periostitis.' A few months after this she began to have pain in right inguinal region and then noticed pus in her urine. Micturition was painful.

but the flow of pus was not constant and gradually diminished. A clinical diagnosis of pustube was made and she was operated upon by Dr. Peterson on August 5, 1903. A mass of adhesions was found about the right tube and ovary, involving the appendix, cecum and small intestine. The appendix was freed from the adhesions and removed. An abscess containing about an ounce of pus was present in the right ovary, and this organ in connection with the right tube removed. The patient recovered from the operation, and a few months ago was reported as perfectly well."

Microscopic examination of the appendix showed it to be the seat of a primary basal-celled carcinoma of the appendix. The following extract is of interest since I have learned that the patient twelve years after the operation is in good health with no signs of recurrence:

"Toward the proximal end the appendix as a whole became somewhat constricted, the lumen much smaller but obliterated in the same way with fibrous connective-tissue trabeculae containing cell-nests as in the middle and distal portions. At the extreme proximal end the tumor nests were fewer and smaller, but persisted to the last section. It is, therefore, probable that the growth extended as far as the cecum but as the patient has for three years shown no signs of intestinal involvement such an extension into the cecal wall may not have taken place. On the other hand, there is still a possibility of a future invasion of the cecum from the stump of the appendix."

In conclusion Warthin says:

"It has been suggested recently that primary carcinoma of the appendix probably plays an important part in the origin of carcinoma of the cecum. I think this is doubtful in so far as the basal-celled variety is concerned, and this form, as has been shown, is by far the most common neoplasm of the appendix. The columnar-celled type may play such a role.

"In conclusion, the great majority of primary neoplasms of the appendix represent a specific type of carcinoma corresponding histologically to the basal-celled carcinomas of the skin, and are relatively of slight malignancy, having little tendency to metastasis and recurrence after operation. While not common, their rarity is evidently exaggerated. They occur most frequently in early life—before the fortieth year. A good prognosis may be given in cases of this type. Their etiology is to be referred to a neoplasia occurring in epithelium snared off during the process of repair in chronic appendicitis, or to a neoplasia of aberrant epithelium in the wall of the appendix."

Dr. Walter A. Hoyt: Dr. Darling spoke about the percentage of these cases which have been reported. In the Annals of Surgery for May, 1914 there appears a report from the Mayo Clinic of over 8,000 appendectomies, with forty cases of primary carcinoma of the appendix. Out of these forty cases, only five times was it possible to palpate a mass in the right side before operation. This gave a .44 per cent. In this series of cases the youngest patient was five years of age. What seems to me most important in this report is the fact that between 90 and 95 per cent. of the cases occurred in obliterative appendicitis, and usually in the tip. In this series one out of every 225 cases of appendectomies showed carcinoma and taking the series of obliterative appendicitis, one out of every thirty-five showed primary carcinoma of the apendix. This, it seems to me, is very important in the diagnosis. In the Surgical Clinic since I have been here there have been three cases. Dr. Darling says he knows of no other prior cases. So our percentage since I have been here would be about .07 per cent. These cases apparently are much more common in the female than in the male.

There is also in the last Annals of Surgery a report of four cases made at a meeting of the New York Surgical Society in which there was a recurrence in two cases out of the four. Two cases were quite far advanced. One of the cases here in the University Hospital showed a palpable mass in the right side. Examination showed a large carcinoma of the appendix. This man returned two months later with secondary carcinoma.

Dr. Darling: I merely want to say a word in regard to the points brought out by the discussion. One is that the evidence with regard to the relative frequency of carcinoma in obliterative appendicitis is very misleading. There is a natural tendency for the appendix to be obliterated without serious symptoms so that comparatively few cases of this type will be operated upon and those operated will come in the period of life when carcinoma is most likely to appear. So I think that those of us who may have obliterated appendicitis ought not to feel that this report is as terrible as it appears.

A CASE OF CONGENITAL CYST OF THE STOMACH.

William Lyon, M.D.
Jackson, Mich.

Baby L., female, was born at the Jackson City Hospital, June 21, 1915. She weighed seven pounds at birth and seemed quite vigorous. The infant began vomiting early in the morning of the 23rd and continued to vomit frequently until leaving the hospital on July 1 when she was taken away for adoption. She had nursed poorly and did not seem to thrive at all. The baby was re-admitted to the hospital the morning of July 9 and weighed five and three-quarters pounds at this time.

I first saw the infant on July 10. She was very stupid and lifeless, refusing all food and water and vomiting frequently a dark brownish liquid, thick with mucus. The bowels had usually moved each day and the stools were always dark.

Examination showed a very pale, flabby body, respiration shallow and irregular, pulse about sixty and very feeble. Examination of the abdomen revealed a mass larger than a goose egg lying in the upper half, freely movable to almost any position, very tense and giving

a feeling of fluctuation. Use of the stomach tube with lavage did not affect the mass at all and delivered nothing but a small amount of brownish mucus.

Diagnosis of a cyst was made and puncture with a trocar was followed by the escape of nearly four ounces of clear, glary fluid, the last of which was quite thick, the empty sac being plainly palpable.

Almost immediately the infant took food and stimulants freely and brightened up amazingly. The sac was appreciably filling the next day and on the third day was quite full with returning symptoms of obstruction. Tapping was again performed July 14 and 17 with much the same results as at first. The weight now was five pounds.

On the 21st the condition was again very bad the weight being four and three-quarters pounds. The rectal temperature was 103 degrees and the pulse weak and irregular. Operation was advised as a last resort, and was immediately performed by Doctors Myers and Brown.

Upon opening the abdomen in the median line, a mass about three and a half inches long by two and a half inches wide presented and was found to correspond to the greater curvature of the stomach and to extend for a short distance past the pylorus upon the duodenum. The lumen of the stomach was small and quite empty. An attempt to remove the sac showed the walls to be very thick and distinctly friable. During efforts at removal the pylorus was cut into and the opening closed with much difficulty because of the friability of the thickened tissue. Nearly an hour was required to complete the operation and the infant was apparently dead at its conclusion. Artificial respiration and the free use of stimulation brought reaction after a half hour and conditions steadily improved for about eight hours, when sudden collapse and death supervened.

The location of the cyst was such that when it was full, the pylorus was practically impervious with no obstruction when the cyst was empty. Before evacuation, the symptoms were very similar to those of any severe pyloric stenosis.

Dr. Blakeslee who made the pathologic examination of the specimen states that the structure was very similar to stomach wall except that the mucosa was thinner and smoother and showed but slight glandular formation.

DISCUSSION.

Dr. Lyon: Dr. Cowie asks me as to the examination of the fluid. The first fluid showed a very small amount of albumin and seemed to be largely composed of mucus. At the time of operation there was a little pus in the fluid, probably from infection during aspiration.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, November 3, 1915

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

FIVE RECENT CASES OF PRIMARY CARCINOMA OF THE VULVA.

FREDERIC M. LOOMIS, M.D.

(From the Department of Obstetrics and Gynecology, University Hospital, Ann Arbor, Michigan).

The following five cases are reported because, in spite of the supposed rarity of the condition, all five have been patients in the Gynecological Clinic of the University Hospital within an interval of twenty days. They interest us also because they add one more bit of evidence, though none is needed, that early diagnosis of malignancy and radical operation may mean life, while the reverse surely means death.

CASE 1. No. 6723, age 68, September 2, 1915. Transferred from Dermatologic Clinic with the diagnosis of squamous celled carcinoma of the vulva.

History.—The patient noticed the growth a year ago, which was then examined by her physician. Aside from the growth there was no pain nor were there symptoms of any kind.

Examination.—On left labium at introitus is a raised indurated mass, with hard base, about the size of a quarter. The inguinal glands are not enlarged. The piece removed for diagnosis showed squamous celled carcinoma.

Operation. — 9-28-11. Cauterized twenty minutes with low heat.

Final Examination.—10-19-15. Fairly well healed; fourchette eroded by irritating discharge which has been much relieved by permanganate douches. Patient says she feels much better.

CASE 2. No. 6763, age 68, October 11, 1915.

History.—Trouble began two years ago. The sore on the vulva enlarged rapidly. Is now very tender, with stinging pains extending to the inguinal regions. Patient was treated by her physician for diabetes but the vulva was never examined.

Examination.—Right labium and fourchette are covered with a broken down, indurated mass, evidently malignant. Extent cannot be made out on account of tenderness. One large tender inguinal gland can be palpated. Patient emaciated, psychopathic, cachectic, and in an almost dying condition.

Treatment.—Referred to the X-ray Department where it was decided nothing could be accomplished. The patient was discharged October 20, 1915 without treatment.

CASE 3. No. 6778, age 66, October 19, 1915.

History.—A small, hard nodule on right labium, rapidly enlarging and becoming tender, was first noticed a year ago. The patient tried vaseline, ointments and washes. Saw several physicians and was told by each it was cancer. Family physician removed the mass two months ago, but the growth returned at once, and is now excessively painful. Patient has lost from ten to fifteen pounds.

Examination.—The right labium minus shows a growth the size of a half dollar, which is hard, bleeds at touch, and is very tender. No inguinal glands can be palpated. The blood pressure is at least 280, the instrument not working above that point. Patient not considered a good operative risk.

Operation.—October 26, 1915 by Dr. Peterson. The entire right labium was removed with wide margins of apparently healthy tissue. On account of the patient's poor condition, the inguinal glands and opposite labium which were apparently unaffected, were not removed. Good apposition was secured with interrupted silkwormgut sutures. Today, eight days after oper-

ation, the patient is entirely comfortable, and the wound is practically healed.

CASE 4. No. 6654, age 39, May 5, 1915.

History.—Three months ago noticed a small lump on the vulva; the labium is hard, tender and reddened. Inguinal glands enlarged. The disease is too far advanced for radical operation. Referred to Dermatologic Clinic where cautery and X-ray were advised.

Operation.—June 4, 1915. Actual cautery and low heat.

Pathologic Report.—Medullary squamous celled carcinoma, far advanced.

Re-entered August 25, 1915. The patient has gained six pounds, and feels much better. The wound has never entirely healed but much relieved. For the past three weeks patient has been much worse.

August 27, re-cauterized, low heat.

September 25, X-ray treatment.

October 4, discharged. Well healed. The patient understands that she is not cured, but is much relieved temporarily.

CASE 5. No. 6701, age 54, September 17, 1915.

History.—This history is important and interesting because the patient was first seen in February, 1903. At that time her history sounds like a bit of a description from Hippocrates. She first noticed, she said, about seventeen months ago, "two little pimples which looked like blisters and ran together; the skin came off with much smarting; it looked like raw meat and from it oozed a clear fluid. This increased slowly in size and the edge felt to be hard and raised; recently this has bled much and at night is the cause of uneasiness and great distress."

Examination.—Both labia involved, indurated, no healed areas.

Pathologic Report.—Squamous celled carcinoma of the vulva, with secondaries.

Operation.—March 6, 1903 by Dr. Peterson. Incisions were made along Poupart's ligaments, five inches in length, on both the right and left sides, several glands being removed from each side. The ulcerated surfaces on the labia were cleansed with hydrogen peroxide and touched with the actual cautery. An oval incision was made, starting just above the base of the clitoris, extending around the labia and reaching below to the upper part of the external sphincter. This incision was deepened, and the entire external genitalia were removed. The parts were brought together with interrupted silkwormgut sutures. In the lower portion the usual perineorraphy was performed. The patient was discharged in good condition.

1909. Small growth again removed after six years of comfort.

1914. No trace till recently. On right labium is recurrence which is ulcerated, indurated, infiltrating and tender. This was removed with as wide margins as possible of healthy tissue. Pathologic examination was the same as before.

1915. Fairly comfortable, but for the past four months has had a tender, ulcerated area on the right side of introitus the size of an olive. This was thoroughly cauterized under low heat September 17, 1915, and the patient discharged, improved on September 30.

Unfortunately early diagnosis of malignancy of the vulva is difficult, at least it is difficult for the physician in general practice. There are a good many things to think of and we must always remember that the easier the diagnosis the worse the prognosis. In the differential diagnosis, we must consider, first, the simple ulcer, which is red, hard, painful, bleeding easily, but usually with a short history and with one distinction, a very ready response to very simple treatment, i. e. to the removal of the discharge and the application of astringents or healing ointments. This results in prompt recovery. If the doctor does not get prompt recovery, he must always assume that he is dealing with something other than a simple ulcer.

Chancroid, with which epithelioma of the vulva may sometimes be confused, has rapid growth, undermined edges, punched out base, and is soft, not hard; there is frequent infection of the adjacent surfaces, early painful enlargement of the inguinal glands, and a history of suspicious coitus in most cases.

The primary lesion of syphilis is hard like cancer and painless like very early cancer, but is usually of a short history, rapidly disappearing, often accompanied by the other evidence of syphilis, by a positive Wassermann and by the other signs with which you are familiar. The tertiary lesion of syphilis is sometimes confusing, but usually not.

Tuberculosis of the vulva may at first be very confusing, being a small indurated patch, slowly growing, but finally breaking down and ulcerating and then healing in places. Tuberculosis produces a rather slow broad ulceration with crooked edges and it may infiltrate away back and penetrate into the bladder. Tuberculosis of the vulva is usually secondary to involvement elsewhere, particularly in the upper genital tract, the infection occurring through

the constant irritating discharge which of course contains the Koch organism. The diagnosis may be definitely made by a pathologic examination of a bit of excised tissue.

Among other confusing conditions I may mention malignancy secondary to squamous celled carcinoma of the cervix, which is sometimes found, though not present in any of the five cases here reported; and chorio-epithelioma, or malignant syncytioma, which is always secondary to a malignant change following pregnancy.

Primary carcinoma of the vulva usually appears first as an annoying "pimple," which is hard, red and spreading. It does not yield in the least to local treatment, does not heal and gradually or rapidly shows the thickened, heavy characteristic border, with a surrounding zone of induration. The surface breaks down and becomes secondarily infected, bleeding at the slightest touch. The outlook at this time is never good for absolute cure, but as seen in one of the cases mentioned, many years of comfort may sometimes be secured by early recognition and radical operation.

DISCUSSION.

Dr. Udo J. Wile: We are particularly interested in carcinoma, or as it might be called, epithelioma of the vulva, on account of the very serious prognosis which Dr. Loomis has mentioned, and also because it illustrates admirably the rule that I think can be laid down, that where an epithelioma is of the squamous celled type, that is to say, wherever a growth invades or is contiguous to mucous membranes, the prognosis is uniformly bad. I had the privilege of seeing two of the cases Dr. Loomis reported. They were cases easy of diagnosis because of the extent of the lesions and the characteristics which he mentioned. Of particular importance in establishing a diagnosis of carcinoma over other conditions is the border, the pearly border which is almost invariably present in these cases, an inverted, hard, indurated border with a peculiar white translucency which no other lesion has.

There is just one point at which I think I might take issue with Dr. Loomis and that, of course, is not a decided point. He said that if these cases could come earlier they might be saved. My feeling is that a squamous celled carcinoma when it can be diagnosed and no matter how early, carries invariably a bad prognosis. Whether this means immediate or early death or not, the prognosis as far as recurrence is concerned is in no way comparable to the basal celled carcinoma or the carcinoma as it occurs early in the glandular structures. The tongue illustrates this point admirably. One sees mutilating operations performed every day and I have yet to see a single case of carcinoma of the tongue which remained cured for any length of time provided that the neoplasm was of the squamous celled variety.

Dr. Howard H. Cummings: Carcinoma of the vulva is an interesting condition because of the small number of cases seen. I think the largest series of cases is reported by an Italian named Catannio. He reports twenty cases and calls attention to the fact that a large per cent. of cases of the disease originate in the lower part of the labium majus. In his series, sixteen occurred here. He believes that irritating discharges play an important part in producing the disease. He also calls attention to the fact that preceding carcinoma of the vulva there is severe pruritus and that trauma by scratching may be another etiologic factor.

Dr. Loomis: I spoke of using a cautery on some of these cases. Some of you are familiar with the Percy method of treatment of inoperable carcinoma of the cervix. The essence of this treatment is the supposed fact that carcinoma cells are more susceptible to heat than other cells. Our inoperable cases treated in this way are fairly satisfactory, more so than by treatment in any other way. We have a sidelight on that treatment just furnished us by a specimen which we have sent to the pathologic laboratory the past few days. This woman received a preliminary cautery treatment and then the radical operation. The surface of the cervix which has been cauterized shows the heat penetrating away in. The carcinomatous cells, however, are relatively very little affected. All through the cervix are nests of live squamous cells which have apparently withstood the heat better than ordinary tissue. Whether this is a comparatively constant finding we do not know. If so, we shall be very much discouraged. In the light of many comparatively good results from this treatment, as a palliative measure, we believe this finding must be the exception rather than the rule.

PARALYSIS OF THE SERRATUS MAGNUS MUSCLE FOLLOWING REMOVAL OF THE GLANDS OF THE NECK.

Carl D. Camp, M.D.
(From the Neurologic Clinic, University Hospital, Ann Arbor, Michigan).

The case that I call to your attention is one of isolated paralysis of the serratus magnus muscle due to an injury of the long thoracic nerve, sometimes known as the external respiratory nerve of Bell, occurring after the operation for removal of tuberculous glands of the neck. The patient was thirty-three years old, a cabinet maker, who came to the Hospital, May 26, 1912, complaining of a difficulty in raising his right arm.

There was nothing of importance in the family history nor in the previous medical history. No typhoid fever, rheumatism or diphtheria and no history of accident. A year before his admission to the Hospital he had an operation for the removal of the glands in the right side of the neck which was done by a surgeon in Chicago. In May, 1911, he had a second operation and another one in June. The operations had been for the removal of glands in the neck and both axillae. The first opera-

tion, however, had been for removal of glands in the right side of the neck and it was after this first operation that he noticed he could not fully raise the right arm. The right arm remained in that condition from that time. There was no pain in the arms or neck and he complained of nothing except the difficulty in lifting the arms. The surgeon told him that the removed glands were tuberculous.

The examination of the patient showed a well nourished individual who was mentally normal. He showed a linear scar extending from the lobe of the right ear down the side of the neck to below the middle of the clavicle and others in the right and left axillary lines. The scars were all healed, apparently by first intention. The grip of both hands was good and about normal. The movements of the forearms were strong. There was no atrophy or deformity of the upper arms or forearms and the deltoid muscles were normal. No atrophy or paralysis of the trapezii muscles. The photograph shows the winging of the right scapula and how the latter rides up when he attempts to raise his arm forward. There was a slight atrophy of the right latissimus dorsi but no atrophy of the supra- or infra-spinati muscles. No affection of the shoulder joint could be made out. The pupils were equal. The tendon reflexes in both upper and lower extremities were normal and the scapulo-humeral reflex was present on both sides. There was an area of anesthesia to light touch both anteriorly and posteriorly to the scar on the left side of the neck, probably due merely to the cutting of superficial nerves in these parts; there was no sensory change elsewhere. The chest expansion was normal and about equal on the two sides.

I record this case because a number of observers have spoken of the great rarity of isolated paralysis of the serratus magnus muscle. It is paralyzed in association with other muscles; in multiple neuritis; as the result of trauma; in soldiers from carrying guns upon the shoulder; or from fall on the shoulder; or from an injury to the shoulder by hyperextension. It is often found, for instance, in those who make a practice of going up ropes hand over hand, or climbing a ladder hand over hand.

The long thoracic nerve is made up of branches from the fifth, sixth and seventh cervical nerves. The branches or roots unite in the body of the scalenus medius muscle, then come to the surface and run down posterior to the brachial plexus and the large brachial vessels. It is posterior to these vessels when it comes through the axilla. Consequently it is practically impossible for stab wounds to divide the long thoracic without injuring some of the other nerves which overlie it. In this case there seems to have been no paralysis of any other muscle except the serratus magnus and the case, therefore, is almost unique in that respect. It is true there might have been some paralysis of the other muscles in the early stages. We did not see him until a year after the onset but the patient told us that his condition was unchanged.

It is an interesting point that, so far as I know, no case of paralysis in the distribution of the long thoracic nerve has been reported following surgical operation for the removal of cervical glands. The case is also of interest from the standpoint of showing the physiology of the serratus magnus. This man was unable to raise his arm above a right angle unless one fixed in some way, by holding the scapula, the scapula to the back. With the scapula so fixed he could raise his arm upward.

The case is reported as a typical illustration of isolated serratus magnus palsy which is rare, with an unusual etiology.

DISCUSSION.

Dr. Theophil Klingmann: The case is surely an interesting one and as Dr. Camp has said, unique. I do not know of an analogous case. It is very seldom we get such an isolated paralysis as this was, so it is also instructive from a physiologic standpoint.

Dr. Walter A. Hoyt: While listening to Dr. Camp's case report, I wondered if there had been any case reported in breast amputations of injury to this nerve. The nerve is so often seen when the complete operation for the breast is done. It seems plausible that it might be injured easily in such operations.

Dr. Camp: In reply to Dr. Hoyt, I would say that I do not know of any such case. It would seem to me, however, that one would hardly expect to get a typical serratus palsy from breast amputations, because if the nerve were cut in such cases it would probably be cut fairly low down and there might well be enough left of the serratus to hold the scapula in position and spoil the main diagnostic features. I have never heard of an isolated serratus magnus palsy from breast amputation.

MULTIPLE SYPHILITIC ULCERS OF THE LOWER LEGS AND FEET.

Francis E. Senear, M.D.

(From the Department of Dermatology and Syphilology, University Hospital, Ann Arbor, Michigan).

The following case is presented not so much because the condition is a rare one, but rather because of the difficulties which it offers for diagnosis. As you see, the case is one presenting multiple ulcers of the lower legs and feet. In

such a case there are always a certain number of diseases which must be considered in the differential diagnosis. Among these should be mentioned the so-called simple or varicose ulcer, the ulceration of tertiary syphilis, the traumatic ulcer, the ulcer which occurs in tuberculosis, and lastly the malignant ulcer or epithelioma.

The traumatic ulcer we can readily dispose of in this case because it would be difficult to conceive of trauma which would cause so widespread an ulceration and affect the localities shown here.

Epithelioma not uncommonly occurs in the lower limbs, but is rather rare in comparison with its occurrence elsewhere. We would expect to find, however, in malignant degeneration of the epitheliomatous type in the lower limbs, the same characteristics that the ulceration would present were it on the face, hands or more common locations. An ulcer which is usually single, has a raised border, presenting the typical pearly margin, a base which is rather irregular and which bleeds easily. In this case the ulcer presents rather a clean base, the margin is not rolled and gives no suggestion of the typical pearly property. The ulceration is also too multiple for such a condition.

With regard to tuberculous ulcers, such an ulceration exists on the limbs practically only in connection with deep seated tuberculosis of the bone. In such a case we find an ulcer which does not present the appearance of these lesions, and is associated with sinus formation; there is usually a considerable amount of discharge, easily expressed, and of a thin yellow purulent nature. The border of the ulcer is irregular and undermined, the ulceration is apt to be very painful and the configuration is apt to prove linear. Also this type of ulceration occurs almost entirely in children.

I may say, going back to the epitheliomatous ulcers, that these lesions are painful only when they are deep.

The varicose ulcer is a very common type. The patient usually shows marked varicosities of the superficial or deep vessels and we are frequently able to show thrombosis. It is usually single, although it may be multiple. The ulceration is also apt to assume an oval form. It is most commonly seen on the inferior surface of the lower limb in its lower third, usually just above the internal malleolus. Such an ulcer usually shows changes in the surrounding skin. Pigmentation is almost invariably present. There is apt to be hypertrophy or sclerosis of an atrophic type of the surrounding skin. We may find considerable edema, which may be either hard or soft. Occasionally there is a lymphangitis of a low grade or chronic type extending up the limb. Such an ulcer usually presents a reddish base which bleeds more or less easily. It is frequently clean but it may be covered with a grayish dirty membrane, or there is a dirty discharge if it has not been kept clean. Of course, if secondary infection be present there may be a purulent discharge. These ulcers occur in people of middle age or past, as does the epithelioma and the gummatous ulcer, and they are usually painless as well. Occasionally we find a varicose ulcer which is painful but the great majority are painless.

This leaves us with the only remaining member of the group, the ulcer of tertiary syphilis. The nodular gumma of syphilis tends to be single and unilateral. The gummatous ulcer is more commonly single and unilateral, but also occurs frequently as a multiple and a bilateral ulceration.

We are all familiar with the characteristics of the ulceration of late syphilis. The ulcers tend to begin with the appearance of a nodule or small tumor which ulcerates later. The ulcer is sharply punched out or it shelves down sharply. The base of the ulcer is usually clean. There is but little if any discharge. The lesions are usually painless and there is a marked tendency, as we see illustrated here, to the formation of crescentic, annular or arciform lesions. This is due to the fact that there are usually present a number of small tumors which take an arciform or crescentic configuration, and as these break down they leave a number of small ulcers showing this configuration. Of course, other signs of syphilitic infection may be present, such as leucoplakia, glandular enlargement, etc.

In this particular case we can rule out readily the tuberculous ulcer from the age of the patient, and the fact that the ulceration is multiple. There is no association with sinus formation. The ulceration is painless and there is no discharge. All these factors enable us to eliminate that possibility readily. The epithelioma we have practically eliminated previously in noting the lack of characteristic margin, the multiplicity of the lesion, etc. The site of these lesions is not characteristic for the varicose ulcers. Many of the ulcers are present on the feet and the largest ulcer is on the outer aspect of the leg rather than on the inner. There are, however, lesions on the inner aspect. There are no marked varicosities. The vessels appear sharply dilated in one location but there is not sufficient varicosity to lead to this extensive

ulceration. The lesions are painless, a finding which would well fit in with that diagnosis. The margins are sharply punched out, however, and there is no tendency to a shelving margin and the base is very clean. So we have in this case a typical late syphilitic ulcerative lesion which, however, is interesting because of the multiplicity of the lesion and the fact that it is bilateral. We rather expect in a syphilitic ulceration of the late type a rather limited pathology. Here, however, we have a large number of lesions affecting both extremities. While this case is one which presents a considerable number of possibilities in diagnosis, the characteristic arciform configuration shown in these lesions, together with the other general characteristics of the ulcerations I have mentioned, leave the diagnosis perfectly clear.

This man has been forced to give up his occupation for the time being on account of the ulcers, inasmuch as they are somewhat tender, but not painful, when the patient is constantly on his feet.

Nevertheless, in spite of this fact the patient should consider himself rather a fortunate individual. In taking his history, we find that he gave no history of having had syphilis, no history to cause him to even suspect that he had this infection. When questioned rigidly as to the possibility he admitted that some fourteen years ago he had had a lesion on the penis which was apparently very trivial and yielded to treatment, local applications of powder causing its disappearance in a few days. He noted no manifestations which could be thought to be part of a secondary eruption or of the secondary phenomena, so he comes to us at this time with a condition which has caused him a great deal of trouble and which because of the absence of history has remained undiagnosed. The fortunate thing is that his late manifestations have selected this location for appearance rather than involving the brain or spinal cord or others of the more vital systems. Tabes dorsalis, paresis or some other manifestation could well have resulted instead of this particular type.

As to treatment, the condition is one which will clear up readily. Almost any sort of antisyphilitic treatment will cause a rapid disappearance of these ulcers. One thing to be kept in mind is that if this ulcer should be the result of a combination of varicose veins and syphilis, the condition would clear up under treatment but after a certain point it would not progress without treatment of the varicose veins. The patient is being treated with intravenous injections of salvarsan and he will be given a vigorous course of mercury upon returning home. Of course, the presence of these ulcers on the limbs would lead us to believe that the patient is free from any manifestations in the central nervous system. It is a general rule that when the tertiary lesions of syphilis manifest themselves in the skin, they do not involve any other system. Likewise patients having tertiary syphilis of the nervous system do not often show tertiary lesions in other systems of the body. In this case lumbar puncture has been performed and the findings bear out this presumption. The spinal fluid showed no increase in cells, and the Wassermann reaction was negative.

DISCUSSION.

Dr. Walter A. Hoyt: The subject of ulcer of the leg is an important one, especially as far as the differential diagnosis goes. Many cases of this nature come into the Surgical Department, and upon all a diagnosis of varicose ulcer had previously been made. They have been treated by the usual method of local applications, and many have been operated upon. It has been our policy in these cases not to operate until the lesion is completely healed. We have made a practice for some time of referring these cases to the Dermatological Clinic, and have found that several of them have proven to be other than simple varicose ulcers.

Dr. Harry B. Schmidt: Are those lesions very infective? I imagine they have been handled a great deal by the home doctor.

Dr. Carl D. Camp: I think there are several points about the case that deserve emphasis. One point is the fact that the patient gave no history of his infection until it was very earnestly inquired into. Possibly had it been a medico-legal case he would have denied all evidence of infection. It is a very important point to remember that the patient may have been infected and may not know it and show no signs, and then come down with severe symptoms such as we have seen in this case, or with disease of the central nervous system.

Another fact to which Dr. Senear alluded is that when you have the tertiary lesions on the skin or mucous membranes or in the bones or other parts of the body, the nervous system frequently escapes and vice versa. I am constantly meeting with cases in which the nervous system shows marked evidence of syphilitic infection and there is positively no evidence of syphilis anywhere else in the body. That I think is an extremely important practical point.

Dr. Udo J. Wile: I think the explanation of this selective action of the spirocheta may be due to certain specific strains which have selective predilections for certain systems. Most interesting work in this connection has been done by Noguchi who has described at least in culture three different types of spirocheta, one type in particular which he differentiates morphologically as a thicker and shorter organism than is usually found in ordinary chancres and different lesions. Soon after describing this shorter type, Nichols in the army was able to in-

oculate a rabbit with the spinal fluid of a patient suffering with early basilar meningitis and spinal fluid of a patient suffering with early basilar meningitis and he recovered from these rabbits syphilis in pure culture, a spirochete, which resembled very closely the short thick form described by Noguchi. Some other work which has been done recently tends to confirm the view that there is a distinct neurotropic organism which has a selective affinity for the nervous system. If this is so we can also assume that there is a strain which attacks mucous membranes and another which attacks bones, etc. It certainly seems that in certain individuals the infection seems to pursue certain lines of predilection.

Dr. Senear: In reply to Dr. Schmidt's question as to the possibility of the home physician becoming infected from this ulceration, in these late cases there is very little possibility of another person becoming infected because at this late stage the spirochetes are not free in the circulatory system, and also the spirochete of syphilis is not a hardy organism and in the presence of secondary infection is destroyed. In the present case the ulcers are clean because they are taken care of daily. When the patient entered there was a small amount of thin discharge and some slight secondary infection. In case spirocheta were present they would be in small numbers and would have been killed in this way. This is rather well illustrated in cases of primary syphilis in making dark field smears for diagnostic purposes. If the lesion is a clean one spirocheta are present in great numbers. However, if the case is one complicated by chancroid or secondary infections, they are rather rare.

Dr. Wile: Theoretically every gumma is infective and this patient can transmit syphilis to anybody through coitus. The danger from contracting syphilis from these open lesions, however, is very slight. In my experience I know of no cases which have been infected from contact with gummatous lesions in the manner suggested for the very obvious reasons which Dr. Senear mentions. If you section such an ulcer you have to get down deep beyond the necrotic tissue, beyond the gummatous tissue into the syphilitic tissue at the base before you can find any spirochetes at all, and then they are very few. If you excise a small portion of such tissue, however, and introduce it into a rabbit you can induce experimental syphilis. From the standpoint of the physician they are relatively benign, but one should always respect them, and handle them very carefully, or better handle them not at all.

SIR JONATHAN HUTCHINSON. AN APPRECIATION.

Mr. Lyle B. Kingery.

I fully appreciate how well a much longer discussion might be devoted to the life of Sir Jonathan H. Hutchinson, and the contributions for which the profession is indebted to him, but this has not been possible in this case, and if important facts are omitted in some instances, or if details are lacking in others, they have been sacrificed for brevity.

Jonathan H. Hutchinson was born at Selby in York, on July 23, 1828. He received his early education in his native town, at a day school. From childhood he showed remarkable studious habits. At sixteen he apprenticed, as was the custom in those days, to Mr. Caleb Williams, the lecturer on materia medica at the York School of Medicine, and the leading surgeon of that city. In 1847 he entered as a student at St. Bartholomew's Hospital, where his ability and industry attracted the attention of one of the great surgeons of that day, Sir. James Paget. With the intention of becoming a medical missionary, Hutchinson worked for several years in various special directions, holding no appointments, but carrying out that system of postgraduate education in his own person, which in later years he advocated so emphatically as necessary to the making of the competent practitioner. With this in mind he studied at several special hospitals, notably the Royal London Ophthalmic Hospital and the Blackfriar's Hospital for the Diseases of the Skin. In 1854, at the age of 26, he received his first hospital appointment of surgeon to the Metropolitan Free Hospital of London. While making his reputation as a surgeon he worked at medical journalism. He visited various hospitals and wrote weekly reports in the *Medical Times* and *Gazette*, the most important rival of the *Lancet* at that time. Soon he was appointed surgeon to the Royal London Ophthalmic Hospital and the Blackfriar's Hospital for the Diseases of the Skin. In 1859 he was appointed assistant surgeon to the London Hospital and was lecturer in the London Medical College on the Principles and Practice of Surgery. We obtain an indication of the highness of his ideals from a short abstract of his second opening address to the medical students of the above college. It is as follows: "The amount of human energy wasted, or worse than wasted, at the present time through want of knowledge is incalculable. A wise and far-sighted man may often be impelled by the resolute pursuit of knowledge to undertakings, at first sight very remote from its walks. A surgeon will be sent to the dissecting room, he will devote his days and nights to the laboratory and to the study, he will come to treat his fellow men, for the time being as though they were so many machines, he will appear to be absorbed in dry, hard matter-of-fact science, when possibly he is urged into those pursuits by a depth of feeling, of which, those who criticise him know nothing. It is curious and very instructive to note, that as a rule, they accomplish most, who begin at the greatest dis-

tance from their object." In these phrases the newly appointed assistant surgeon to the London Hospital revealed himself. Special work can never be too special from his point of view. It was not the acquisition of facts that was wanted but the interpretation of those facts in the light of all other knowledge.

At the age of thirty-five, in 1863 he began lecturing on medical ophthalmology. He also became associated with the Royal Locke Hospital in 1862. In 1865 he gained the Ashley Cooper clinical prize of Guy's Hospital for an essay on Injuries to the Head. In 1873 he became senior surgeon at the London Hospital Medical College. At the Royal College of Surgeons he was Hunterian Professor of Surgery and Pathology from 1879 to 1883, in the former year being elected to the council, and in 1880 appointed to the court of examiners. He served on the royal commission appointed in 1881 to inquire into the condition of the London hospitals for smallpox and fever cases, and the means of preventing spread of the infection, and later served on the Royal Commission on vaccination. In 1882 he was elected Fellow to the Royal Society and in 1908, at the age of eighty he received the honor of knighthood for his distinguished services to medicine, an honor which he is said to have declined on a former occasion. His declining this honor on a former occasion is illustrative of his simplicity and modesty of nature for which he was universally admired. He received honorary degrees from the Universities of Glasgow, Cambridge, Edinburgh, Oxford, Dublin and Leeds. He was a corresponding member of the Surgical Society of Paris and an honorary member of many European and American societies, having the distinction of being the first honorary member of the American Dermatological Association.

Hutchinson was a most voluminous writer, among the foremost of his productions being, the Archives of Surgery, A Manual on Syphilis, A Clinical Memoir on Certain Diseases of the Eye and Ear, Consequent on Inherited Syphilis, The Pedigree of Disease, and in 1906 Leprosy and Fish Eating, not including his many contributions to various periodicals. His assembled monographs alone make up several volumes.

Thus Hutchinson gained the well earned title of the Universal Specialist. It is impossible in this account to describe or even enumerate the many original contributions made by him to surgery, ophthalmology, neurology, dermatology and syphilology, yet it may prove of interest to recall briefly some of his contributions in the latter branch of science. As a dermatologist and especially as a syphilographer, he stands well among the foremost, and leaves as milestones in our knowledge of this disease, such terms as, "Hutchinson's Mask," the masklike expression in tabes dorsalis, "Hutchinson's pupils" referring to the unequal size of the pupils in meningeal hemorrhage, "Hutchinsonian teeth" occurring in hereditary syphilis, the latter with the usual accompanying interstitial keratitis and labyrinthine disease, being known as "Hutchinson's Triad." It is interesting at this point to read his original report, made on May 18, 1858, to the London Pathological Society on "The Effects of Infantile Syphilis in Marring the Development of the Teeth." It is as follows: "For a considerable time past I have been in the habit of recognizing in a certain very peculiar development of the permanent teeth, an indication that their possessor had in infancy suffered from hereditary syphilis. A remark to this effect which I made at a meeting of this Society some time ago being received with expressions of incredulity, it occurred to me that it might be well to make public such evidence as I possessed on the subject. My friend, Mr. Coleman, our dentist at the Metropolitan Free Hospital, readily agreed to take casts of the patients I might send to him. Most of the cases taken were those of patients attending the Royal Ophthalmic Hospital on account of chronic interstitial keratitis, which, I believe almost always is a result of hereditary syphilis. The ages varied from 28 years to 5. In all a clear history of syphilis was established. The number of casts was thirteen in all and in all cases a portrait of the patient was secured. I may here remark that cases, in which young adults display indubitable marks of having suffered from infantile syphilis, and in which also a clear history is obtainable, are very frequent in the practice of general surgery. Had it not been for the field offered by the Ophthalmic Hospital in connection with the form of keratitis above averted to, I should not have been able to collect in the allotted time, a tenth of the cases. With these remarks as to the nature of the evidence, I will now pass to the conclusions arrived at.

No. 1. That there is a peculiar condition of the teeth which results from the influence of hereditary syphilis, and that the most frequent features of this condition are the following:

A. Smallness, the form being peggy with wide interspaces.

B. Notching, either one broad shallow notch

or two or three smaller ones giving a serrated appearance. This notching is often worn away.

C. Color. The teeth have a greyish discolored surface, destitute of polish in spite of any amount of cleansing.

D. Wearing down. This softness from deficiency of enamel renders them liable to premature wearing down. A syphilitic's teeth may be worn down at the age of 20, especially the front teeth.

E. The signs mentioned, apply almost exclusively to the incisors and canines. These conditions are totally distinct from those produced by the ravage of caries.

The above remarks apply only to the permanent set. The milk teeth of syphilitic infants, are liable to exfoliate before being cut and after having been cut are often of small size, bad color, and liable to decay; the notching and peglike form being rarely noticed. I have no doubt that the explanation of the fact that they suffer less uniformly than the permanent set, and in a different way, is to be found in the fact, that at the time of the original stomatitis, they were already well formed, while the others existed only as soft pulps. It is, I believe, to the occurrence of syphilitic stomatitis during the first few weeks of life and its complications with alveolar periostitis, that the marring of the teeth is to be attributed. A patient may be syphilitic, but if in infancy, he escapes stomatitis, his teeth will not be damaged.

There remain two or three questions to which it may be well to attempt as explicit answers as the subject permits of, before closing these observations:

1. May not the condition of the teeth described, result from other influences besides syphilis?

As to this I have no doubt that any stomatitis in infancy involving the periostium and investing membrane of the teeth, could produce the same imperfections of development. As far, however, as my observations have gone, I believe it is rare for any other form of stomatitis to produce such a regular type of deviation from what is normal in size, shape and color.

2. In cases of syphilitic patients in which this peculiar type of malformed teeth is observed, may it not be more reasonably attributed to the influence of mercury given to counteract the disease, than to the disease itself?

As regards this, I am disposed to conclude from many cases observed, that mercury instead of causing, tends to diminish, dental malformation.

Third and lastly, do subjects of inherited syphilis always present dwarf teeth?

Undoubtedly not. I believe it is essential to this condition that the patients shall not merely have inherited a taint, but that they shall have suffered severely in infancy from consequent inflammation.

In conclusion I may remark that the state of the teeth is often of great use in enabling us to decide whether certain other symptoms presented by the adult patients, are the results of inherited or acquired syphilis. In two or three cases in which patients between the ages of twenty and thirty came under my care, presenting the sunken nose, the fissured lips and earthy complexion of syphilis I was enabled by a glance at the teeth to determine at once that they were in all probability, due to congenital and not to acquired syphilis."

Such were the first observations on Hutchinsonion teeth.

Hutchinson's investigations in inherited syphilis were not confined to the dental changes alone, as he gave at an early date very exact reports of changes in the eye known as interstitial keratitis. He also interested himself in the peculiar form of deafness found in inherited syphilis and thus became known for the triad which bears his name.

From an early period he interested himself in leprosy, and in 1863 asserted that its cause was "Some ingredient or parasite generated by, or introduced into fish," which had not been cured or badly cured. A study of the geographical distribution convinced him that neither climate nor race had anything to do with the disease. The fact that it prevailed almost exclusively on islands, the shores of continents and along the course of rivers, led to the conviction that it must in some way, be connected with the eating of fish. From this hypothesis two corollaries followed: 1st. That leprosy is not contagious, and 2nd. that segregation is of little use. The discovery of the bacillus by Hansen in 1871 caused a revival of the contagionistic doctrine. In 1901 Hutchinson went to South Africa, and in 1902 to India to investigate statements made by certain observers, that leprosy existed in those who never tasted fish. He found these statements incorrect and from an enormous amount of evidence, which he collected with his characteristic acumen and skill, he set forth the following important facts in favor of his hypotheses:

1st. Leprosy is more prevalent in Roman catholics who eat fish regularly.

2nd. The number of lepers in all India is about five to every 10,000 inhabitants, while on the fishing islands along the Indian shore it is 150 to every 10,000.

3rd. Finally, the disappearance of leprosy with the advance of civilization favors his fish hypothesis, being attributable to the dietetic habits of the people as modified by advancing civilization.

In spite of the professional activities with which his days were crowded, he still found time for other interests and was a man of broadest general culture.. Like John Hunter, he took note of the whole animal world. Near his country place at Haslemere he established an educational museum containing objects illustrating a great variety of subjects, as rocks, fossils, stuffed animals, skeletons, plants etc; he was something of an expert in all. He also included in his museum a rare accumulation of original drawings, colored plates and photographs, illustrating clinical work in medicine and surgery. Through the instrumentality of Sir William Osler, this collection has been presented to the Johns Hopkins Medical School. On education and social topics he had thought much and he had a plan for state bounties on children, intended to promote their increase as the chief wealth of the nation.

It was here at Haslemere, that he died June 23, 1913, at the age of 85. In his death must be recognized the passing of a most versatile genius, distinguished as an eminent surgeon, an active practitioner, a leading skin specialist, a great authority on syphilis, a noted medical journalist, and a prolific contributor to the scientific and literary periodicals of his time. For all of these, reward came to him surely and steadily in the form of honorary degrees, but to quote a biographer "he had a richer reward than these, for by his persistent labor and the faithful exercise of his gifts he made himself of that rare species of masterworker whose reward is that he has served the whole human family. The few men of whom this may be said are bearers not only of worldwide fame, but they have moved the world sunward, and led mankind onward into new fields of truth. The inscription on his funeral notice strikes the keynote of his life:

"I thirst for truth,
But shall not drink it till I reach the source."

DISCUSSION.

Dr. Udo J. Wile: It will always be a very treasured memory to me that in 1908 through the kind introduction of Sir William Osler I was privileged to visit with Sir Jonathan Hutchinson a few years before his death. He was a most remarkable looking old gentleman. He was almost blind at the time I saw him and at the same time was very successfully conducting a large practice among a very wealthy class of syphilitics. His office was on Powers street and he had an old army servitor attendant at the door. The letter that I had was an admirable introduction and I had two or two and a half hours with him at the expense of the patients in the waiting room. I am reminded particularly of his great versatility. Imagine a man who not only gained international repute as a surgeon, but was well versed in a dozen other branches of science as well. His writings on surgery alone would make fully a stack of books as high as he stood. He made the statement, however, that he loathed surgery, that he never was a good surgeon and that he felt sorry for many of the patients that came under his care. His son, Jonathan Hutchinson, Jr., is interested in surgery and it is interesting to note that Woods Hutchinson, the popular magazine writer is a nephew of old Sir Jonathan Hutchinson.

I was invited by him at that time to go to Haslemere and to attend one of his informal lectures. The lecture was a rambling sort of affair that lasted practically the whole afternoon and touched practically every subject that you could think of, paleontology, zoology, surgery, dermatology, and then wandered off to the planets, and of all he spoke not as a tyro but as a master. He knew about all of these things. It was told of him by one or two of his acquaintances at London that his presence at medical meetings was always a matter of chagrin to the other doctors. Somebody with great éclat would tell about a supposedly rare case that he had run across and was unable to find another case like it in the literature. Then it usually happened that Sir Jonathan would get up and say that he had photographs of three or four such cases in his atlas of rare diseases which he had reported many years ago.

I am going to pass around what Hutchinson called the "Small Atlas of Clinical Illustrations" which he inscribed to me. This being the smaller atlas, shows the immense versatility of the man.

I think the Society is indebted to Mr. Kingery for this very interesting paper.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, December 1, 1915

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

CYSTIC TUMORS OF THE ABDOMEN WITH REPORT OF THREE CASES.

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The object of this paper is not a review of the literature, but an attempt to emphasize the more important points in diagnosis of the most common cystic tumors of the abdomen namely; (1) hydatid cysts of the liver, (2) pancreatic cysts, (3) omental cysts, (4) hydronephrosis, (5) ovarian cysts. Cysts of the spleen because of their rarity are not considered.

CASE 1. Clara M. age 6 years, American, entered the University Hospital July 15, 1915 because of enlargement of the abdomen.

Family History.—Negative except for history of cancer on the maternal side.

Personal History.—Negative except for measles with good recovery. No history of hemophilia.

Present Trouble.—About three years ago in April, 1912 the patient fell down stairs, sliding on the abdomen. She complained of pain that day but was up the following day. The patient was constipated for several days and was not relieved by cathartics. A few days later she was seen by a physician who made a diagnosis of appendicitis with peritonitis, but no operation was performed. The patient was sick for three weeks with fever, prostration, nausea and vomiting, and at the close of this attack with edema of the lower lids. This latter sign passed away in a few days. Casts in the urine were present. As the attack disappeared her mother first noticed a tumor of the abdomen of about present size. Since, there has been no marked increase in the size of the abdomen. After catharsis the mass becomes smaller but has never completely disappeared. Sudden jarring causes pain. The patient has lost some weight. The appetite is good; there are no night sweats, no jaundice and no swelling of ankles. No blood has been noticed in the urine. The patient has never complained of severe pain nor inconvenience from the tumor.

The urine examination is negative. Blood examination; 90 per cent., reds 5,350,000, whites 6,300. Differential count and smears negative. Wassermann examination negative.

Examination.—Well nourished child, negative except for the abdomen. Examination of the chest is negative. On inspection of the abdomen a swelling is noticed arising from beneath the left lower ribs and left flank, extending beyond the median line, and about two finger breadths below the umbilicus. This swelling is symmetrical and does not move on respiration. Palpation reveals a smooth tumor mass cystic in character which moves but slightly, except laterally. Percussion shows tympany above and to the right of the tumor, dullness extending toward the spleen and kidney. There is some tympany above the pubis. There is no fluid wave and no change of percussion on change of position. Auscultation is negative. Inflation of colon shows increase in tympany above and to the right although none is present along the left of the mass. Rectal examination is negative.

Treatment.—The patient was admitted to the Genito-Urinary Clinic for tumor of the left kidney. On account of the age of the patient cystoscopic examination was not made. An exploratory incision was made, however, over the left kidney and this organ was found to be normal. The patient was then transferred to the General Surgical Department and

the condition diagnosed as cyst of the omentum, pancreas or spleen. Operation August 6, 1915 through a right rectus incision revealed a large tumor mass adherent to the omentum and abdominal wall, the origin of which could not at first be determined. The mass was aspirated and a brownish fluid material removed. The cyst was then opened and a large amount of fluid and organized blood clot removed. The lining of the cyst was enucleated from the surrounding peritoneum, and it was then found that the cyst was omental in origin. The surrounding part of the peritoneum was brought together with a purse string of catgut, and a rubber tube inserted. Further examination revealed a second cyst in the lower left quadrant originating from the omentum. This was ligated with catgut and removed. The large cyst when filled was about seven and a half inches long, four inches wide and four inches thick. Pathologic report: "Cyst has dense hyaline wall bordering on cavity filled with organizing blood clot containing much pigment."

The patient left the Hospital on the twentieth day following the operation with the wound completely healed; recovery uneventful.

CASE 2. Mrs. K. age 39, married, Russian, entered the University Hospital November 22, 1915 for tumor of the abdomen.

Family History.—Her father died at the age of 72 from tumor of the breast. Her mother died at 71 of stomach trouble.

Personal History.—The patient has no knowledge of children's diseases. There has been no definite illness except headache. She has lost fourteen pounds in three years. The health is generally good and at present she has a good appetite and sleeps well. She has been in this country for about fifteen years. The patient has three children living and well and three dead, one dying of throat trouble one of scarlet fever and one of pneumonia.

Present Trouble.—The present trouble began five years ago with sour stomach and nausea, the condition being diagnosed as stomach trouble. At this time there was first noticed a small mass in the upper abdomen to the right of the median line beneath the rib margin. When first noticed it was only the size of a walnut and has gradually grown to the present size. The patient now has no symptoms whatever except slight tenderness on pressure over the mass. She has never been jaundiced; there have been no night sweats. There is no vomiting and the bowels are regular.

Urine examination negative.

Blood examination shows eosinophilia and secondary anemia.

Examination.—Inspection shows an enlargement of the upper abdomen arising beneath the right rib margin and extending downward nearly to the umbilicus, and filling the upper half of the abdomen. The mass moves on respiration. Palpation reveals a smooth movable tumor with a small nodule below about the size of a hickory nut. The size is estimated to be about as large as a cocoanut. Percussion shows flatness continuous with that of the liver with tympany below and to the left of the mass. No thrill or wave is present on examination. Auscultation is negative. Pelvic examination shows pelvic inflammation. The mass has no definite connection with the pelvis. No X-ray examination was made and the colon and stomach were not inflated. A diagnosis of omental or hydatid cyst was made.

Treatment.—Operation December 1, 1913. The abdomen was explored through a right rectus incision. On opening the abdomen the anterior surface of the liver appeared in the wound which later proved to be the left lobe. To the right of this could be felt a rather large gallbladder which emptied easily. The left lobe of the liver was very thin and attached to the inner side of this lobe was a mass the size of a large cocoanut. On the right and inferior border of this was another nodule about the size of a walnut, the liver was enlarged and there were a few adhesions to the omentum. The mass was cystic and extended back to the base of the liver, and over its surface were numerous nodules. A diagnosis of hydatid cyst was made. The surrounding tissues were packed off and the cyst opened. The latter contained a colorless fluid and several hundred small growths, white circular masses containing semi-fluid material. They varied in size from the size of a pin head to that of a hickory nut. These were removed and a large drainage tube inserted, the neck of the cyst being sutured to the parietal peritoneum.

Pathologic diagnosis, "echinococcus cyst." Examination shows the typical picture of the daughter cyst. The cyst was irrigated daily with ½ per cent. formalin and glycerine solution. The condition improved, but at the patient's discharge there was still a small fistula although very little discharge. Two unavailable efforts have been made to ascertain the present condition of the patient.

CASE 3. Mrs. M. age 37, housewife, Scotch, entered the Gynecological Clinic on July 15, and transferred to Surgery July 20, 1915.

Chief Complaint.—Mass in the abdomen.

Family History.—Negative except for some tuberculosis in the family.

Personal History—Practically negative. Eight children all living and well. Operation for lacerations after first childbirth.

Present Trouble.—About one year ago the patient noticed a hard mass just above the umbilicus. This caused no symptoms. Two months ago while consulting her physician for jaundice a tumor about the size of two fists was found slightly to the right in the upper abdomen. Since that time the jaundice has disappeared but the mass has increased in size rather rapidly. The patient has never had any pain, no loss of weight, no diarrhea and there is no history of injury.

Blood examination negative. Wassermann examination negative. Urine examination; albumin and granular casts. Functional test on kidneys 38 for two hours. Examination of the stools negative, fat not present. Blood pressure 110.

Examination.—There is a symmetrical swelling in the median line extending to the left side. This mass arises from under the ribs and extends below the umbilicus. Palpation reveals a smooth tumor which fluctuates and is apparently cystic. Dullness is found on pressure with tympany above and below. The mass is not movable and does not move on respiration. Inflation of the stomach and colon shows some obliteration of the dullness, the distended colon being below and the stomach well under the ribs and to the right. Cystoscopic examination was negative. X-ray examination showed two normal kidneys with no indications of stone. Bismuth injection of the stomach and colon gives a shadow arising in the median line between the stomach and colon. The stomach is displaced up under the ribs and to the right. The colon is distended and shows evidence of obstruction at the splenic flexure. Pelvic examination shows a movable uterus and appendages with a slightly lacerated cervix and perineum. The condition was diagnosed as a cystic tumor arising from the pancreas or spleen.

The patient was operated upon July 26, 1915. A median incision revealed a large cystic mass about six inches in diameter. The stomach and pylorus were attached along the upper border. At the pylorus was a softened area suggesting imminent rupture. The tumor had its origin in the median line between the stomach and the colon and was entirely separate from the kidneys, spleen and liver. A diagnosis of pancreatic cyst was made and a trochar passed into the tumor and the fluid removed. Removal of the cyst was deemed inadvisable and after emptying its contents the cystic cavity was washed out with a 1 per cent. formalin solution. Drainage of the sac was secured by a surgical pack and a small rubber tube. The cyst wall was then sutured to the parietal peritoneum, and the abdomen closed.

The patient left the hospital twenty-seven days after operation, a small sinus still persisting. A letter from the patient received one week ago states that the sinus is completely closed and that the patient is five and a half months pregnant.

The case histories of these different varieties of cysts are striking in their similarity. The patient usually gives a negative history up to the time the tumor is palpable and until symptoms are caused from mechanical reasons. In pancreatic and omental cysts there is very commonly a history of injury to the abdomen a few days to several years previously. The case of omental cyst (Case 1) reported in this paper illustrates this point. The fact that these cases are practically symptomless for so long a period will account for the late operative interference. Reports of small pancreatic, hydatid or omental cysts are not found in the literature except where the conditions were accidentally discovered in routine exploration. A slow symptomless growth is the rule in all of these cases, therefore, the history is of no great significance. Often a history of the patient coming from a northern country, Russia or Iceland where the inhabitants are in close relationship with dogs, is of importance as in the hyadid cyst reported, (Case 2).

After the cystic tumors have become of sufficient size to be palpable and visible, it is important to ascertain where the mass first made its appearance. Hydatid cysts usually appear on the right side of the abdomen beneath the edge of the liver in contradistinction to pancreatic cysts which appear as a rule in the median line above the umbilicus. Ovarian cysts rise out of the pelvis in the median line, while kidney cysts arise from either flank, later extending across the median line toward the pelvic or liver margin. There is nothing constant in the place of appearance of an omental cyst.

Pain likewise is not always present or constant. However, there is often present in kidney cysts a history of early pain resembling renal colic with a partial or complete disappearance of the tumor. Any of these conditions

when the cysts have reached large proportions may cause pain by pressure, the location depending upon the organs pressed upon. Rather severe pain is often met with in pancreatic cysts through pressure on the celiac plexus causing reflex pain in the back and under the left shoulder. This pain with the accompanying nausea and vomiting has led to the diagnosis of intestinal obstruction in a few cases. If a hydatid or ovarian cyst becomes infected, the resulting pain may aid diagnosis. Pain in an omental cyst is rare even after it has reached a considerable size. Nausea and vomiting are rare except in cases of pancreatic and hydatid cysts. Jaundice is a frequent symptom of a pancreatic cyst, is sometimes present in hydatid cysts, but is rare in hydronephrosis.

The data of most diagnostic significance is derived from the examination of the abdomen and special examinations.

It is not possible in the limits of this paper to even outline the methods of abdominal examination. No part is so unimportant that it should be neglected, and the success of a correct diagnosis will depend to a large degree upon the attention paid to complete and routine inspection, palpation and percussion of the abdomen.

In conjunction with the history of the first appearance of the enlargement, the origin and general position may be determined by inspection. By a careful study of the consistency, shape, size and general contour of the tumor it usually is not difficult to determine whether the mass be solid or cystic. When this point is once settled the field of possibilities has been greatly reduced. In the case of hydatid cyst, the so-called "hydatid fremitus" obtained by tapping over the cystic mass is of diagnostic value. Unfortunately it is not constant and in the case reported, this condition was not found even though several attempts were made to ascertain its presence.

The presence of ascites as an independent condition or an accompanying complication is of course important. A varying degree of ascites may be present in either kidney, hydatid or pancreatic cyst caused by obstruction to the portal circulation. The failure to recognize ascites has been the cause of many mistakes in the diagnosis of ovarian cyst.

The determination of mobility is often helpful. It is to be remembered that the relative mobility of a cyst depends upon the relative mobility of the organ from which it has its origin. Hydatid and kidney cysts show some mobility on respiration in contrast to the other cystic conditions. It is to be borne in mind, however, that the formation of adhesions between a cyst and other organs, or the abdominal wall, renders valueless signs dependent upon mobility. No abdominal examination is complete without rectal palpation. By making the simple digital examination as a routine the surgeon will avoid many embarrassing errors in diagnosis.

By means of a careful cystoscopic examination and injection of the dilated pelvis or cysts of the kidney with thorium or collargol, followed by X-ray plates, a hydronephrotic kidney can be definitely diagnosed. This is of great aid in the treatment of the cysts under consideration, for while most of these cysts can be treated through an abdominal incision it is much safer to deal with hydronephrosis by the extraperitoneal route. This is of great diagnostic value in kidney cysts extending into the pelvis and so often mistaken for ovarian cysts.

A thorough pelvic examination by an experienced surgeon is usually sufficient to confirm or disprove the presence of an ovarian cyst with the possible exception of a kidney condition and in conjunction with the cystoscopic examination this latter can easily be ruled out. The other cystic conditions under consideration very seldom simulate an ovarian cyst on pelvic examination.

The relations of the tumor with the inflated stomach and colon are often of value in diagnosis. An important general rule to be borne in mind is that abnormally movable viscera and tumors tend to be displaced in the direction whence they came, e. g. a movable kidney tends to resume its normal position, etc.

In the case of pancreatic cysts not attached to the anterior wall the previous dull areas after inflation of the stomach and colon may be completely replaced by the tympany of the over-riding and distended viscera. When by inflation it can be demonstrated that a cystic mass arises between the stomach and colon, the diagnosis of pancreatic cyst is almost certain, since the majority of such cysts appear between these structures. It is to be remembered, however, that cysts of this organ may appear above the stomach or below the transverse colon. On the other hand, in the case of hydatid cysts, we usually find the stomach and colon below and to the left of the tumor.

In kidney cysts the distended colon lies over the tumor or to the inner side, while in omental cysts there appears a collar of distended colon about the mass. Ovarian cysts seldom have

intestine over them and the distended stomach lies above the cyst or under it. Large cysts of the spleen lie over the colon with the stomach above and to the right.

The various laboratory tests have their place but may or may not be of diagnostic value. In hydatid cysts, as a rule, on differential blood count an eosinophilia along with a secondary anemia will be found present. In the other conditions there is nothing unusual. The presence of blood, albumin and casts may prove of great help in the diagnosis of hydronephrosis. It must be borne in mind, however, that these abnormal constituents may be absent entirely, and that albuminuria is not uncommon in hydatid and pancreatic cysts brought about by pressure on the kidneys or ureters. The presenec of fat in the stools is important in the diagnosis of pancreatic cysts, but unfortunately this sign is absent in a large proportion of cases.

The differential diagnosis of different intra-abdominal conditions has been greatly aided by the great advances in Roentgenology from which much more may be expected in the future. The greatest advance has been made in the diagnosis of kidney conditions, relatively few observations having been made as to radiographic pictures in the case of the other abdominal cysts. The X-ray, however, has its place and is useful in confirming the results of inflation of the stomach and colon. It has the advantage too of showing the displacement of the abdominal viscera.

The diagnostic aspiration of these cystic tumors is distinctly contraindicated. It is in the highest degree dangerous to introduce an aspirating needle through the abdominal wall into a cystic abdominal tumor not adherent to the parietal peritoneum for the purpose of determining its contents and character. Not only may intestines be punctured, but irritating and infectious material from the cyst itself may be distributed throughout the abdomen. In very few cases, except kidney and hydatid cysts, are such diagnostic punctures of any value. Aspiration should not be carried out unless followed immediately by laparotomy, and if laparotomy is to be performed the preliminary procedure is of little value.

With our present methods of diagnosis of abdominal tumors, we can say that mistakes in the diagnosis of ovarian and hydronephrotic cysts should seldom be made, but in the case of the other abdominal cysts especially where the tumor practically fills the abdomen the

CHART SHOWING SYMPTOMS AND SIGNS OF CYSTS OF THE ABDOMEN.

	Injury	Jaundice	Early Appearance	Pain	Movement on Respiration	X-ray	Urine	Inflated Stomach	Inflated Colon	Blood	Stool
OVARIAN	—	—	From pelvis mid line	— Unless infected	—	+ or —	—	Above	Above	Negative	Negative
HYDATID	—	+ or —	Beneath liver	— Unless infected	+	+ or —	Albumin	Below and right	Below	Eosinophilia Sec. anemia	Negative
PANCREATIC	+ or —	+ or —	Median line above umbilicus	+	—	Helpful	Sometimes Albumin	Above usually	Usually below	Negative	Fat not constant
OMENTAL	+	—	Nothing constant	—	—	Helpful	—	Above	Around tumor	Negative	Negative
KIDNEY	—	Very seldom	Either Flank	+	+	Diagnostic	Albumin casts	Median and above	Over or median	Negative	Negative

diagnosis may be doubtful even after a most thorough study of the case.

How then should these cases be handled? A most complete and routine examination of these conditions should be made taking particular care to rule out cysts of the kidney and conditions other than cystic in nature. If a positive diagnosis of hydronephrosis is made, the extraperitoneal route is to be preferred. Since the treatment of the other cystic conditions is purely surgical and best carried out by an abdominal section, the surgeon is justified in performing such an operation, even though a positive diagnosis is not possible.

DISCUSSION.

Dr. Cyrenus G. Darling: There is one type of cyst that has merely been mentioned, but no specimen has been presented, that is, a cyst of the spleen. I had the good fortune a number of years ago to have such a case in a girl 16 years of age where there was a cyst associated with the spleen which contained seven pints of fluid. There was no history of injury in this case and it seemed to have developed shortly after an attack of measles, but whether there was any relation between the measles and the cyst of the spleen I am unable to say. The tumor filled the whole left side of the upper abdomen to below the umbilicus and pressed upward against the diaphragm in such a way as to limit its motion. There were some adhesions which tended to hold it in place. The cyst had apparently developed from the lower border of the spleen and was of the non-infectious type. I removed both spleen and cyst since it seemed impossible to remove the cyst alone without great danger of hemorrhage. It was the seventh case reported in this country at the time that I operated, although since that time there have been a few other reported cases.

You will notice that in the omental and the pancreatic cyst, and the one I have just mentioned, the fluid was apparently due to hemorrhage and that in all of these cases the origin was probably traumatic. In the development of these cysts we have the formation of a wall either from the layer of peritoneum outside of the organ itself or developing from the peritoneal covering of that organ; in the omental cysts from the peritoneal covering; in the cysts of the pancreas also probably developing from the peritoneal covering; and the cyst enlarges as the fluid increases.

There may be some doubt as to the method of treatment in these cases. Two methods have been mentioned here, one of draining the cyst and the other of completely removing the cyst wall, and in the case of the spleen removing the organ from which the cyst arose together with the latter. If we knew what the relations of these cysts were to the deeper bloodvessels, perhaps all of them could be removed, but the danger of encountering severe hemorhage in a locality where it would be difficult to control makes it better in most of these cases to evacuate the contents and then treat the cyst in such a way that the fluids will not form again. In the case where the cyst was entirely removed we started out to remove a portion of the wall and finding it separated easily we continued until it was entirely taken out. Many of these cases could probably be treated in the same way if we could always be sure that serious trouble would not be encountered. The echinococcus cyst is so close to the liver and the inflammation is so marked that the cyst is usually left behind and treated by injections which destroys the material which otherwise would lead to a continuance of the condition.

The diagnosis of the cyst of the spleen may be easily made, provided the spleen remains in its normal position, but many times the cyst develops in a movable spleen situated low down in the abdomen. It is not always easy to make a diagnosis of cyst of the spleen even when the latter organ is known to be displaced; in fact a number of instances of mistakes in diagnosis have been reported.

An ovarian cyst may sometimes present serious complications. I might mention a case which occurred some years ago where a patient entered the Surgical Clinic with the history of having been operated upon in a Chicago hospital for tuberculous peritonitis. She was referred to the Hospital under the supposition that the abdominal cavity had refilled from the same disease. There was also a large ventral hernia. I opened this abdomen and found a large amount of gelatinous-like fluid in the abdominal cavity. After removing as much of this as possible, I encountered a ruptured ovarian cyst. The resulting inflammation had formed such marked adhesions all around this cyst that I thought the safest way would be to stitch the opening of the cyst to the abdominal wall and wait until the inflammation subsided. I did this and some two or three months later removed the ovarian growth. This patient made a good recovery, went home and two years later returned with another cyst of the same nature which had formed on the other side.

After these cysts rupture into the abdominal cavity the diagnosis is rather difficult before the abdomen is opened although comparatively simple after the incision is made, the tumor palpated and some of the contents aspirated. The great danger in using the aspirator before incision to confirm the diagnosis lies in the fact that fluids, like material from an echinococcus or pancreatic cyst may contaminate the peritoneum. We never are sure in examining cysts of the upper abdomen that one or the other of these cysts may not be present.

Dr. James G. Van Zwaluwenburg: Dr. Hoyt has been kind enough to refer to the X-ray as a helpful method in diagnosis. I think he is rather overestimating the value of such examination because in each one of the cases he has enumerated the X-ray diagnosis was of no more value than the clinical diagnosis.

In the case of abdominal tumors, the amount of information which can be secured with the X-ray is only limited by the amount of time, pains and material you desire to spend on the patient. Ovarian cyst has been differentiated from ascites by the X-ray in our own clinic. The diagnosis of hydatid cysts by the X-ray has been reported in the literature several times. Pancreatic and omental cysts unless unusual conditions be present are characterized by the displacement of other organs. In kidney cysts it is diagnostic. A large hydronephrosis usually cannot be shown because it does not become large

unless it is "a closed hydronephrosis" and then it is impossible to inject the kidney. In that case the tumor mass may be shown. It takes usually more than one observation and more than one method and very frequently we have to wait for the bowels to be clear between examinations before we can utilize another method of examination.

Dr. Harry M. Malejan: In looking over some of the old records in the Surgical Clinic, I came across a case of a professor in the University who was operated upon for echinococcus cyst of the liver. This gentleman had visited Italy for a year or two and contracted the disease over there. Hydatid cyst is very common in the Levant and Egypt and almost every country in the Mediterranean basin. It was mentioned that you find cases of hydatid cysts in the northern countries, Russia, Iceland, Labrador and Alaska. We all know that it comes from close association with dogs and for that reason we must always bear in mind hydatid cyst in people that come from those countries.

Dr. Hoyt: I have just one more point to make about pancreatic cysts. There has been a line drawn between the true pancreatic cysts and the so-called pseudo-cysts. The latter appear between the stomach and transverse colon having their origin in the lesser cavity. A definite history of injury is present and on examination they are found to be no more than very large hematomata. No definite relation with the pancreas can be made out. In the case of the pancreatic cyst which was reported, the pathologic report came back "hematoma with no definite pathology to show its origin." We might have been dealing with just such a condition in that case.

SOME EXPERIMENTS IN LUNG SURGERY.

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Although much experimental work has been done upon the surgery of the lungs and some operations of this kind have been successfully performed upon man, it still continues to be a dangerous field for surgery and some facts may yet be discovered experimentally which will prove of practical value in performing these operations upon man.

The experimental work which forms the basis of this paper was done by means of Meltzer's insufflation apparatus in which the pressure was furnished at first by the operation of a pair of bellows and later by means of compressed air.

The use of intratracheal insufflation to maintain an adequate pressure of air while operating upon the thoracic organs has been known since the time of Vesalius who in 1560 discovered that he could prolong the life of an animal after opening its thorax to study the motions of the heart by blowing through a tube introduced into the trachea.

Robert Hook on October 29, 1667 delivered an address before the Royal Philosophical Society in which he showed that the respiratory movements were simply for the purpose of bringing about a supply of fresh air to the lungs. He experimented upon a dog, opened its chest and kept it alive by blowing air into its lungs by means of bellows, occasionally permitting the lungs to collapse and then distending them. Upon ceasing the blast the dog would fall into dying convulsive fits but revived again upon inflating the lungs.

During the latter part of the eighteenth century the bellows were generally used in England to resuscitate people who had been drowned and it was then known that there was danger of over distension of the lungs if the blast was made too vigorously.

Desault in 1790 introduced a rubber catheter into the trachea in order to relieve difficult breathing due to stricture of the larynx. In 1827 Le Roy pointed out that if a very high pressure were maintained with the bellows it might result in emphysema and death. The use of an intralaryngeal tube for croup was described by Bouchut in 1857-58, and O'Dwyer of New York described his intubation apparatus for diphtheria in 1885. In 1887 Fell of Albany described his method of artificial respiration by means of a pair of bellows and a tracheotomy tube. Francois Frank brought out two forms of positive pressure apparatus in 1896. In the same year Quenu and Longuet made a positive pressure apparatus and Tuffier advocated insufflation in operations upon the pleural cavity. This was tested experimentally upon animals and clinically in operations upon man in the hospitals of Paris. In Quenu's apparatus the head was placed in a chamber which resembled a diver's helmet. Compressed air and chloroform were used for the insufflation. In 1900 Matas employed the Fell-O'Dwyer method in intrathoracic surgery.

In 1904 the attention of experimenters in intrathoracic surgery was somewhat diverted from the use of positive pressure by the researches of Sauerbruch of Germany. The latter, following the advice of Mikulicz had done considerable experimentation with the object of overcoming the ill effects of pneumothorax during and after intrathoracic operations by the use of negative pressure. Woillez in 1875 had already invented his "Spirophore" which made use of negative pressure. Sauerbruch enlarged the "spirophore" at first to the size of a small cabinet just large enough for operating upon dogs and later on into the form of a

cabinet large enough for operations upon man. As a result of much experimentation upon dogs Sauerbruch concluded that positive pressure produces numerous disturbances in the normal circulation in the lungs. Brauer (1904) and Seidel (1907), however, found that the changes were so slight as to be of no importance when only enough positive pressure is used to prevent pneumothorax. Cloetta (1910-1913) made some experiments with a special lung plethysmograph to determine the effects of positive and negative pressure upon the circulation in the lungs. He resected the chest wall and placed the lungs in a glass plethysmograph and stopped the respiratory movements by the use of curari. In this manner he proved that if the lung is distended to the same degree exactly by positive and negative pressure, one-third less pressure is required with the negative than with the positive or if the same amount of pressure is used in each case the lung will be more distended with negative pressure. Furthermore, he showed that with the same distension of the lungs, the aortic pressure falls more with positive pressure than negative and that the pressure in the pulmonary artery rises higher with positive pressure and there is an increased diastolic pressure in the right ventricle. A high degree of positive pressure results in compression of the lung capillaries. Experience has shown that a slight degree of positive pressure is not dangerous but high or long continued pressure may result in serious reflex disturbances in the lungs and deleterious effects upon the circulation, depending upon the reserve power of the right ventricle.

All animal experiments seem to show that total extirpation of one lung has a higher mortality with positive pressure than negative, because the pressure of air in the empty pleural cavity which cannot be entirely driven out prevents the collapse of the chest wall and change in position of the diaphragm, mediastinum and sound lung which is necessary for recovery. These facts have been well established by experimental evidence. Block, Gluck and Schmid made researches of this kind in 1881. Biondi in 1884 obtained four recoveries in fifteen operations. Mayer of Brussels reported two recoveries in seventeen total pneumectomies on dogs. Janeway removed one entire lung in five dogs with recovery, using positive pressure. Sauerbruch and Haecker, using positive pressure, lost thirty-four dogs out of thirty-eight in their first series of experiments. The extirpation was done through one intercostal incision. Eleven died of leakage from the bronchial stump, five from primary infection at the time of operation and eighteen from the pressure resulting from pleural exudate. In the second series of twelve dogs, eight died.

Robinson in 1908 reported a series of thirty thoracic operations on dogs by means of his positive pressure apparatus. In this series there were nine deaths and twenty-one recoveries. There were nine simple pleurotomies with two deaths and seven recoveries. One experiment was merely the application of the positive pressure without opening the thorax to demonstrate whether the method of anesthesia was dangerous in itself and this ended in recovery. There were nineteen excisions of the lung with seven deaths and twelve recoveries. Another experiment consisted in clamping and releasing the lower lobe of the lung and ended in recovery.

Willy Meyer under a combination of positive and negative pressure performed twenty-one total excisions of the lung with seventeen recoveries. Removal of one or more lobes was done six times with five recoveries. In a series of twenty-four cases there were twenty-two recoveries. At one time twelve dogs were operated upon without a single death. Giertz operating with positive and negative pressure, used a flap of the fascia lata for covering the wound in the lung after resection and had eight recoveries out of ten operations upon large dogs. In rabbits there were no deaths. Robinson and Sauerbruch in 1910 found they got better results by resecting four ribs when a complete extirpation of one lung is done than if the operation is done through an intercostal space. The collapse of the chest wall thus obtained helps to close off the space left in the chest cavity thus tending to prevent pneumothorax but if a larger resection is done the animal may die because the operated chest wall offers no resistance to pressure within the sound lung, as a result of which the thin mediastinum is apt to rupture, resulting in a double pneumothorax

Schlesinger in 1911, using Meltzer's apparatus, did seventeen total pneumectomies with five recoveries. He generally found air in the pleural cavity postmortem in the operated side and sometimes in the unoperated side. Kawamura (1914) has successfully removed the entire left lung of dogs and in a few instances a part of the right lung also at a second operation. This was done by means of Shoemaker's positive pressure apparatus.

So far there have been sixteen cases of pneumectomy in man with eight deaths. Helferich, 1898, removed the middle and lower lobes of the right lung in man for sarcoma of the chest

wall. Heidenhein in 1901 removed the left lower lobe of the lung for bronchiectasis and this was followed by a fistula. Stretton in 1906 successfully resected the upper lobe of the right lung for tuberculosis. Robinson in 1912 removed the lower lobe of the left lung for bronchiectasis. Kümmell in 1911 removed the entire right lung from a man, 48 years old, for carcinoma. This patient died on the sixth day from edema of the lungs and tracheal rattling. Postmortem showed necrosis of the lung stump on account of the fact that the bronchi and vessels of the lung were clamped with forceps.

Resection of the lung is a very dangerous operation both on dogs and on the human being on account of the danger of pneumothorax and of the difficulty of making a hermetic closure of the bronchus and lung. Infection may also take place from the outside if the wound gapes open or drainage is used. Another source of infection of the lungs and bronchi may result from the presence of germs in the nose and throat which are driven inward by the insufflation apparatus. This is particularly true of dogs which are affected with distemper as may be seen from my experiments. Distemper is a nasopharyngeal catarrh occurring in dogs and caused, as Ferry proved, by the bacillus, bronchisepticus. The disease is accompanied by respiratory, abdominal and nervous symptoms and often results in death. It is the common presence of this infection in dogs together with their necessary confinement in laboratories, when accustomed to an out-door life, which lowers their resistance to surgical operations and makes the results of experimental surgery much less favorable than the same operations upon man.

The statistics of experiments in lung surgery with positive and negative pressure show much better results with the latter because it produces conditions closely resembling the physiological. Robinson and Sauerbruch in 1909 concluded that the space left behind after doing intrathoracic operations under negative pressure diminishes rapidly but that this is not the case in such operations done under positive pressure as most of the dogs died from the formation of an exudate. I found similar results in my experiments. Kawamura, however, found no exudate after his operations although be used Shoemaker's positive pressure apparatus. The great difficulty in these operations is to prevent pneumothorax and infection, both from the interior of the lung and the outside, without causing any damage to the histologic structure and circulation in the lungs.

Dogs are especially unfavorable subjects for these operations on account of the shock which results from exposure and loss of body temperature, their inability to stand pneumothorax well and their low resistance to infection in the pleural cavity. They bear peritoneal infection very much better as can be seen from the numerous successful abdominal operations that have been performed upon them. The pleuritic exudate which generally forms after these operations acts unfavorably because the normal circulation is important for the elimination of germs from the pleural cavity as was proved by Nötzel's experiments. This fluid is absorbed very much more slowly by the inflamed than by healthy pleura. Grober in 1901 thought that this slow absorption was due to the fact that the stomata are closed by fibrin and that the endothelium is damaged by the inflammation. The same is true of the absorption of air in pneumothorax. Dorpat in 1893 showed that 78 cubic centimeters of air was absorbed in twenty-four hours by a dog weighing 11.7 kilograms, but that it took four days to absorb 35 cubic centimeters of air when the pleura is inflamed.

The exudate which forms after a thoracotomy causes compression of the lung which has a bad effect upon its circulation and function. Secondary infection of the compressed lung may result in the formation of areas of pneumonia as may be seen from my experiments. Drainage is apt to be allowed by pneumothorax and secondary infection of the pleura. In experiment VI where the entire left lung was removed, the entire pleural cavity on that side was filled with a thick fibrinous coagulated exudate. This was nature's effort to overcome the bad effects of pneumothorax. Tiegel invented a drain which allows fluids to escape, but prevents the entrance of air or fluid into the pleural cavity. In the case of wounds of the lung in man, pneumothorax can be prevented by the use of Tiegel's drain and emphysema may be treated by aspiration according to Bier's method.

The peculiar anatomy of the dog's thorax gives it very little resistance to pneumothorax. In this respect it differs from the rabbit very much. The thorax in man offers considerable resistance to pneumothorax as in only about 5 per cent. of intrathoracic operations does it become necessary to use any apparatus to prevent pneumothorax. Surgeons have known this in the past because numerous operations have been done for empyema and lung abscess without the use of any differential pressure ap-

paratus. In chronic cases of empyema, owing to the formation of firm adhesions between the lung and parietal pleura and because of the fixed position of the mediastinum it is possible to resect portions of all the ribs of one side without danger to life. Children can usually stand extensive resections of the chest wall and lung because their relatively soft chest wall can readily contract and the diaphragm lies high so that the space which is left behind soon becomes closed off. Conditions in the rabbit are similar.

In the dog these conditions are entirely different as the animal will die in a few minutes if a wide opening is made in the chest without the use of differential pressure. In this animal the mediastinum is a wide, very delicate and transparent membrane and there is a mediastinal band extending from the neck to the diaphragm. On this account it is unable to resist any marked changes of pressure within the thorax without injury to the heart and pulmonary circulation. The thickness and rigidity of the mediastinum in rabbits enables them to stand pneumothorax for a long time. Although the operated lung and heart follow the mediastinum into the normal side of the thorax during inspiration, still the mediastinum gets into its normal position during expiration. In the case of the dog the mediastinum is so loose and delicate that it flutters up into the wound and often becomes perforated thus allowing air to get into the sound half of the thorax resulting in double pneumothorax. In consequence of this the pressure of the external air in the opened side of the thorax exercises dangerous compression upon the normal lung which is unable to drive the air out entirely even with the help of the diaphragm and the accessory muscles of respiration. Le Play and Mantoux showed that by induced pneumothorax they could render all but one-sixth of a dog's lungs atelectatic without causing death.

In 1910 Meltzer introduced his method of intratracheal insufflation for the purpose of maintaining a positive pressure within the lungs in order to prevent pneumothorax during intrathoracic operations. The technic of this method was established by a long series of experiments upon dogs. A soft rubber catheter is introduced through the larynx into the trachea after the patient has been thoroughly anesthetized. The lower jaw is propped widely open and the tongue is drawn forward until the epiglottis is recognized. The latter is then drawn forward with a long pair of curved forceps and the catheter passed along the forefinger until it enters the larynx. The catheter should be provided with a terminal opening instead of a lateral one. After the catheter is introduced as far as it will go it is deeply in the right bronchus and it should be slightly withdrawn (about 5 to 6 centimeters) and secured in position so that it will not slip out of place. It should be determined whether the catheter is in the trachea or esophagus, as acute dilatation of the stomach will result if it is in the latter. This will prove fatal unless the air is removed from the stomach by disconnecting the catheter with the apparatus and making pressure over the stomach until the distension is relieved.

After the catheter is attached to the insufflation apparatus, ether mixed with air is blown into the lungs either by pressure upon a pair of bellows or by a connection with a compressed air apparatus. This apparatus is connected with a mercury safety valve which is set at 30 millimeters so that if the pressure in the apparatus exceeds that point the excess of air will bubble off through the mercury. The average pressure which should be maintained for intrathoracic operations upon dogs is 18 to 25 millimeters. The pressure in operations upon man may be raised to 35 to 40 millimeters. Meltzer considers it safe at any point below 50 to 60 millimeters. There is also a valve attached to the apparatus for the purpose of releasing the pressure in the lungs about six times a minute for a period of two seconds at a time to prevent shock and damage to the lungs. This also relieves the obstruction to the flow of venous blood to the right auricle from the great veins of the chest and abdomen. The size of the French catheter varies from 18 to 24 or with a diameter of 8 millimeters and a lumen of 4 millimeters according to the size of the animal.

This method of anesthesia will not be accompanied by asphyxia if the catheter is of the proper size and the blood is well aerated. My experiments show that it does cause some damage to the alveoli of the lung. Severe shock and reflex disturbances are likely to follow this method of anesthesia if the pressure within the lung is maintained at a point higher than 25 to 30 millimeters.

Sauerbruch proved by animal experimentation that the breathing capacity can be reduced to one-tenth of normal without endangering the oxygen content of the blood. Spontaneous breathing should take place at all times during the anesthesia.

Seidel showed that there is a fall in blood pressure upon interrupting the pressure in the lungs. This fall in blood pressure was equalized so that it returned to normal before the cessation of the interruption. The pulse curve also showed some irregularity.

Robinson reported in 1913 that intratracheal anesthesia had been used in 1402 cases with seven deaths. It is very useful in operations about the mouth, nose and throat as well as those within the chest, because blood and mucus cannot enter the glottis.

A series of pneumectomies were performed upon dogs at the Surgical Laboratory of the University of Michigan, using Meltzer's apparatus for intratracheal insufflation in order to determine whether there are any serious dangers connected with this method of anesthesia. The technic which was used in these operations was as follows: The field of operation was shaved on the day before the time set for operation. The dogs were given nothing to eat for twenty-four hours previous to the operation. A hypodermic of morphin gr. ¼ and atropin gr. 1/150 was given one-half an hour before the beginning of the anesthesia. This dose was doubled in the case of the large sized dogs. After placing the animal upon the table the field of operation was scrubbed with a sterile brush and soap followed by sterile water, acetic acid and alcohol then sterile water again followed by a solution of bichloride of mercury 1-1000.

After the animal was completely anesthetized the catheter was introduced through the larynx into the trachea until it met an obstruction, then it was withdrawn about five centimeters and attached to the insufflation apparatus. The same aseptic technic was followed in these operations as is customary in any major operation upon man in a modern hospital. Following is a description of these operations.

Experiment I—April 14, 1913.
Excision of a portion of right lung.
Result: Recovery.

Catheter introduced through larynx into trachea by Dr. Lilly after the dog was anesthetized with ether by the open method by Miss Davis. We were not able to maintain a continuous pressure of 25 millimeters of mercury as recorded in the manometer connected with the apparatus. A leaky valve was found and repaired but still the pressure was not well maintained by means of the foot bellows which was used for producing the pressure. The catheter was evidently too small for the size of the trachea. The mouth was packed with cotton in consequence of which the pressure was better maintained during the remainder of the operation. A portion of one rib was resected and the lower lobe of the right lung brought into the field of operation. The lung was held in position with a large pair of intestinal clamps, the ends of which were covered with rubber tubing. The wound in the lung was sutured with black silk upon a round needle, care being used to cover all the raw surface with the serous coat or visceral pleura. A rubber drainage tube was inserted and sutured to the pleura, intercostal tissues and skin with linen thread. A rubber dam was placed over the tube and its edges sutured to the skin in such a manner that fluid could escape from the pleural cavity without air entering, thus preventing postoperative pneumothorax. A dressing of gauze and laparotomy pads was held in position by means of a many tailed bandage. There was some dyspnea following operation but it was not severe.

April 15, 1913—Dog breathing quite easily, respirations not greatly increased in frequency. The dressings were found saturated with serous fluid, the wound was cleansed with a 1-1000 bichloride solution and sterile dressings applied.

April 17, 1913—Rubber dam has disappeared. Infection and suppuration of the entire wound with separation of the edges of the skin. Fresh dressings applied. Dog is in a good condition and is able to walk around and drink water.

May 7, 1913.—Dog doing well, fistula nearly closed, some shortness of breath on affected side.

June 2, 1913.—Fistula entirely healed and the dog fully recovered from the operation. The dog was killed with cholorform at this time because he developed a lumpy jaw infection.

In this case we have the rare good fortune to have a recovery after a pneumectomy despite the fact that an empyema developed. Adequate tube drainage prevented the empyema from becoming fatal.

Case II. Operation, May 29, 1913.
Excision of one lobe of right lung.
Result: Death from empyema in five days.

Catheter introduced by Dr. Lilly. A portion of one rib was resected and the lower lobe of the right lung removed. At one time the dog came near dying, marked cyanosis of the lung tissues was noticed and the pressure went down to ten millimeters. It was due to a wrong position of a stop cock which did not allow enough air to pass through. This was fixed and the pressure maintained at 25 millimeters afterwards. Tube drainage covered with

a rubber dam, as previously described for Operation I, was used. Dressings and bandage applied. This dog died of empyema at the end of five days.

CASE III. Operation. Excision of lower lobe of left lung.

Result: Death in two days.

Object: To attempt the operation without the use of tube drainage. December 16, 1913. Miss Davis gave anesthetic. Catheter introduced into the larynx and connected with the Meltzer apparatus. The left side of the chest was opened by means of Kocher's incision. Twenty millimeters of pressure was maintained as recorded in the apparatus. One rib resected. The mediastinum bulged into the wound, being driven over by the pressure in the right lung. It was packed off with gauze. A portion of the lung was removed using intestinal clamps covered with rubber to hold the lung in position. The bronchi were tied off with black silk. The opening in the lung was carefully sutured with black silk. Wound of the thoracic wall closed off in layers. The dog suffered severe dyspnea when he recovered from the anesthesia. Two days later or on December 18, 1913 the dog died. Autopsy showed the pleural cavity about one-half filled with serous fluid. There were numerous soft adhesions between the operated lung and the parietal pleura. Stitches in lung found in position, none of them having torn through. Intense congestion of operated lung. Death was probably due to pressure upon the heart and lung by the pleuritic fluid.

CASE IV. Operation. Resection of lower lobe of left lung.

Result: Death from empyema one month after operation.

Anesthetic given by Miss Davis. March 12, 1914, 8 p. m. Operation performed under intratracheal insufflation. It was difficult to bring the pressure up to 25 millimeters on account of leakage of ether vapor around the corks of the Wolf bottle. The corks were fastened down more securely with wire and surrounded with paraffin which enabled us to continue the operation. The left side of the chest was opened by a Kocher incision, with resection of one rib. The inflation of the lungs seemed to be fairly good and they retained their normal pink color throughout the operation. A large portion of the lower lobe of the left lung was removed. There was considerable hemorrhage from the cut surface of the lung which was controlled by ligation of the vessels with black silk. The cut surface of the lung was cauterized with the actual cautery upon the suggestion of Dr. de Nancrède. The raw surface of the wound in the lung was covered up by suturing the serous coat and lung tissue over it. A rubber drainage tube was inserted and stitched to the intercostal muscles. A piece of rubber dam was placed over the tube and its edges stitched to the surrounding skin. Dressings of gauze, pads and Scultetus bandage. The dog breathed quietly after recovery from the anesthesia.

March 16, 1914.—Respirations 30; dog apparently doing well but does not move around much. Very little discharge upon the dressings at present.

March 17.—Dressings soaked with fluid and pus. Tube still in position. Fresh dressings applied.

March 24.—Some hemorrhage from wound, tube removed.

April 11.—Dog died, it had been losing flesh and strength for some time. Death was due to empyema.

CASE V. Operation: Resection of lower lobe of the left lung.

Result: Death in three days from postoperative pneumothorax.

March 17, 1914, 8 p. m.—The tube was introduced into the esophagus instead of into the larynx by mistake. The stomach became distended with air at once. The tube was disconnected from the apparatus and compression made over the stomach to expel the air. The tube was then removed from the esophagus and introduced into the larynx and again connected with the insufflation apparatus. An incision was then made over the left side of the chest and a portion of three ribs resected. The lung was well distended, reaching the thoracic wall and had a good pink color. The lower lobe of the left lung was removed. The wounded vessels and bronchi were tied off and the general oozing stopped by the appplication of the actual cautery. Tube drainage was employed and a piece of rubber dam placed over it and its edges sutured to the skin. Sterilized dressings and Scultetus bandage applied. After the removal of the catheter, the dog made considerable noise during respiration with marked dyspnea, respirations, 20.

March 20.—Dog died probably from the distension of the stomach during the time of operation and pneumothorax.

CASE VI. Operation: Removal of the entire left lung.

Result: Death in six days from postoperative pneumothorax.

March 24, 1914, 8 p. m.—Dog operated under intratracheal insufflation, anesthetic given by

Miss Davis. Torek's incision along the seventh intercostal space was used. From the posterior end of the seventh intercostal space the incision was carried upward to the third intercostal space and four ribs were resected subperiosteally near the spine. The phrenic nerves could be easily recognized and when the lung was retracted upward one could see the esophagus under the arch of the aorta and the vagus nerve with its branches. The pulmonary ligament was divided. The pulmonary artery and veins were ligated. The main bronchus was ligated and the end sutured over so as to invaginate the mucous coat. Tube drainage was used and a rubber dam placed over it and its edges sutured to the surrounding skin.

March 26.—Dog jumped out of a box about four feet high and shows some dyspnea.

March 27.—Severe dyspnea, abdominal type of respiration marked, rate, 25. The dressings were all saturated with a bloody purulent fluid. Fresh dressings were applied.

March 29.—Marked dyspnea, respirations 25, dog is very weak and cannot stand up. There has been a free discharge of fluid from the wound.

March 30.—Dog died. Postmortem showed a thick fibrinous, coagulated exudate which filled the whole pleural cavity and blocked the drainage tube. The right lung floats in water. Death was due to pneumothorax and infection from the bronchus.

Case VII. Operation: Resection of portion of left lung, result, death on operating table from paralysis of the glottis.

April 8, 1914, 8 p. m.—It was found impossible to introduce a semi-elastic English catheter into the larynx after the dog was anesthetized. A No. 21 soft catheter was then introduced. Incision in seventh intercostal space and a portion of two ribs resected subperiosteally. A portion of the lung was removed and the wound cauterized. Wound closed without drainage. As soon as the catheter was removed the dog stopped breathing. The tube was again introduced but the dog breathed only at long intervals and finally died apparently from paralysis of the glottis.

Case VIII. Operation. Resection of a portion of the left lung.

Result.: Death in two days from pneumothorax and empyema.

April 21, 1914.—Ether administered by Miss Davis. Under complete anesthesia a number 21 French catheter was introduced into the larynx and trachea without difficulty. Pressure kept at 15 to 22 millimeters but a good deal of the time it was only 8 millimeters on account of the difficulty of maintaining pressure with the bellows. Interruptions in the pressure were made every fifteen seconds for two seconds at a time.

An incision was made in the sixth left intercostal space, axillary line, and extended to the posterior scapular line. The blood was very dark in color, showing that there was insufficient aeration of the blood in lungs because of the low pressure of air in the apparatus. A portion of one rib was resected subperiosteally. The pleural cavity was opened, the edges of the wound retracted and the lower lobe of the left lung grasped with forceps protected with rubber and the greater portion of this lobe removed. The bronchi and important bloodvessels of the lung were ligated with silk. The edges of the wound were sutured with mattress stitches of silk. One stitch was passed through the lung and the chest wall to be tied on the outside so as to hold the lung up against the chest wall. A rubber drainage tube was introduced to a point just inside of the pleural cavity in the most dependent part of the wound. A rubber dam was sutured over it after the wound was closed in the manner which has been previously described. Dressings and bandage applied.

April 22.—Dog stands on his feet but the respirations are very rapid and shallow, rate 80.

April 23.—Dog died at 9 a. m. Postmortem examination showed that the dressings were soaked with pus and fluid. There was a widespread emphysema upon the left side of the chest and all through the thoracic cavity. There was a very thick purulent fibrinous exudate covering the mediastinum, pericardium and diaphragm. There were numerous adhesions between this exudate and the pleura and lung. The heart contained current-jelly clots. The suture attaching the lung to the chest wall had torn out. Numerous round worms were found in the lumen of the stomach and intestines.

Bacteriologic examination of the exudate shows a staphylococcus infection. Pathologic examination of the lung tissues by Dr. Warthin shows a purulent fibrinous exudate covering the pleura and involving the greater portion of the lung, also hemorrhage into the alveoli and interstitial emphysema. Death in this case was undoubtedly due to pneumothorax, the result of inadequate pressure in the lungs during the time of operation. The catheter was evidently too small for the size of the animal.

Case IX. Operation: Resection of one lobe of left lung.

Result: Death in two days.

May 19, 1914, 8 p. m.—Miss Davis gave anesthetic. The same aseptic precautions as in any hospital surgical operation. Towel clamps applied. End of intratracheal catheter cut off so that it had a terminal instead of a lateral opening. Incision in seventh intercostal space. The distension of the lung was good, ribs retracted with mouth gag, lung grasped with rubber protected clamps and one lobe removed. The bronchi were ligated, cautery applied to wound and the lung carefully sutured. A drainage tube was introduced about two inches from the spine and only to edge of pleura. The air around the operated lung was aspirated with a small air pump and a rubber dam was applied over the tube and sutured into position. Aseptic dressings applied.

May 20.—Dog jumped out of box, dyspnea present.

May 21.—Dog died. Edema of all the tissues and fluid found in both pleural cavities. Tube was blocked with fibrin.

"Postmortem examination shows acute emphysema, rupture of the alveolar walls, congestion and edema. The large tear appears to be postmortem," Warthin. I had inserted the catheter into the trachea and insufflated with the bellows to see how much pressure the lungs would stand without rupturing. No rupture was noticed on the surface of the lung. A moderate distension, therefore, is all the lungs will stand during insufflation without the lungs being so badly damaged internally that the patient cannot recover.

Case X. Operation: Resection of one lobe of left lung.

Result: Death on the table from too low a pressure.

May 27, 1914, 8 p. m.—Miss Davis gave anesthetic. Number 18 French catheter introduced into the trachea. The fourth, fifth, sixth and seventh ribs were resected subperiosteally. The lungs were very dark in color from cyanosis. There was great difficulty in breathing. The distension of the lungs was not sufficient to maintain an adequate aeration of blood to sustain life. Portion of lung removed, bronchi and pulmonary vessels ligated. Lung sutured with interrupted mattress stitches. As soon as the catheter was removed the dog stopped breathing and died. Postmortem showed a marked congestion of the lungs, the color being very dark. The mediastinum had a small rupture. According to Dr. Warthin, the microscopic examination of the lungs showed "Intense congestion and hemorrhage with rupture of bronchioles and alveoli in many places. Alveolar structure completely lost in solid mass of blood in some areas." Death was undoubtedly due to incomplete insufflation of the lungs with consequent complete pneumothorax.

In the following experiments the pressure was maintained by means of compressed air which was installed into the laboratory. This gives a more constant pressure than the bellows and hence is more satisfactory for intratracheal insufflation anesthesia.

Case XI. Operation: Resection of one lobe of left lung.

Result: Death in one week from over insufflation and empyema.

October 16, 1914, 8:30 p. m.—White bull dog weighs 32½ pounds or 14⅝ kilos. Intratracheal insufflation with compressed air and ether. All possible aseptic precautions used in operation. Safety valve set at 30 millimeters. Resection of one rib subperiosteally. Drains of Japanese silk containing cotton used to protect the lung from the edges of the resected rib. Portion of the lower lobe of left lung excised. Bronchi and vessels ligated and cut surface of lung treated with the actual cautery. Careful closure of wound of lung with mattress stitches of silk. Tiegel drain placed in wound so as to prevent postoperative pneumothorax. Air pressure maintained for twenty minutes after the wound was closed. Dressings and bandage.

October 18.—Dog stands up and drinks water, no dyspnea.

October 19.—Dressings changed, some pus discharged with bloody fluid. Respirations 34.

October 20.—Dressings soaked with pus.

October 21.—Tube removed, respirations jerky, 40. Dog seems quite sick, but drinks water and stands up in his cage.

October 22.—Large amount of pus discharged from wound. Jerky respiration, dog has lost considerable flesh, rapid thready pulse.

October 23.—Dog died. Postmortem; right pleural cavity shows hemorrhagic exudate and infiltration of lung. Latter floats in water. Left lung shows purulent infiltration, stitches have cut through. It sinks in water. Adhesions between lung and chest wall and between the lung and diaphragm. The pathologic report from Dr. Warthin is as follows: "Kidney, slight cloudy swelling, marked congestion; liver, cloudy swelling, congestion. Stomach, congestion. Operated lung, multiple abscesses, generalized purulent pneumonia, atelectasis, organizing fibrinous pleuritis. Other lung, intense passive congestion, large hemorrhagic areas with tearing of walls, edema. Both hemorrhage

per rhexin and per diapedesis." It looks as though the catheter used in this case was too large and the pressure consequently obtained in the lungs was so great as to damage the alveolar structure of the lungs to such an extent that recovery was impossible.

In the following experiments the thoracic cavity was closed without drainage to lessen the danger of infection in the pleural cavity from the outside. A strip of the fascia lata was taken from the thigh under aseptic precautions and sutured over the wound in the lung in each case.

CASE XII. Operation: Resection of lung without drainage.

Result: Death in two days from probably too much pressure in the insufflation apparatus.

November 4, 1914, 8 p. m.—Black dog weighing 15 kilograms or 53 pounds. Operation under intratracheal insufflation. Respirations were quite shallow. One rib resected subperiosteally and lung resected. Bronchioles and vessels ligated, lung wound sutured with linen thread. A strip of fascia lata was sutured over the wound in the lung. Dog stopped breathing while the wound was being closed and it was found that the pressure was too high at 30 millimeters and so it was reduced to 15 to 20 millimeters. The wound was closed without drainage. Respirations were 40 and pulse 132 when the catheter was removed.

November 6.—Respirations 40. Dog stands up and drinks water. Examination of urine shows no albumin nor sugar.

November 7.—Dog died. Fluid in left pleural cavity, none in right. The right lung has not as many hemorrhagic areas as the one in the last experiment. Pathologic report from Dr. Warthin. "Right lung; very early stage of bronchial pneumonia, areas of gangrene, edema, area of hemorrhage, acute emphysema. Liver, congestion. Spleen, marked hemosiderosis, marked blood destruction somewhere in body. Acute passive congestion. Operated lung; early stage of purulent pleuritis. Bronchial pneumonia. Acute edema. Intense congestion. Hemorrhage. Kidney; acute passive congestion, slight cloudy swelling."

The hemorrhages and emphysema in the lungs were undoubtedly due to an excessive pressure in the insufflation apparatus. The bronchial pneumonia and marked blood destruction in the body may have been due to infection from the distemper germ which was carried into the lungs by the insufflation.

CASE XIII. Operation: Resection of lung,

Result: Death in three days from infection with the distemper germ.

Operation November 11, 1914, 8 p. m. by Drs. Hayes and Cattermole. Dog weighs 40 pounds or 18.2 kilos. Intratracheal insufflation anesthesia. Pressure kept at 25 millimeters. Wound closed without drainage. Respirations 35 when the operation was completed.

November 13, 8 a. m.—Respirations 22, but grunty, pulse irregular, about 100. Bowels moved, urine normal. Dog looks very sick.

November 14.—Dog died; very little fluid found in either pleural cavity. Suture line in lung intact and covered with a layer of coagulated exudate.

Pathologic report from Dr. Warthin. "Operated lung. Fibrinopurulent pleuritis. Purulent pneumonia, multiple abscesses. Intense congestion."

CASE XIV. Operation: Resection of one lobe of left lung.

Result: Recovery.

Case XIV. Taken six months after operation.

December 29, 1914, 8 p. m.—Dog weighs 19.8 kilograms or 44 pounds. A number 24 French soft rubber catheter was used for intubating the larynx and trachea, and the pressure kept at 25 to 30 millimeters.

Operation performed by Drs. Hayes and Cattermole under strict aseptic precautions. A strip of the fascia lata was used to cover up the wound in the lung.

December 30.—Dog stands up in cage, respirations 40, pulse rapid. Bowels have moved.

December 31.—Respirations 40, pulse 120-130; temperature 102.8 per rectum. Normal resonance on percussion over the entire lung.

January 1. 1915.—Respirations 40, pulse 130, temperature 102. Tympanitic resonance over entire left chest with crackling of subcutaneous

Case XIV. Excision of upper lobe of left lung. (A) Stump of excised lobe. (B) Left lower lobe. (C) Right lower lobe.

tissues upon palpation. Normal resonance over right lung.

January 2: Respirations 40, pulse 132 and temperature 101.5°. The dog gradually improved, and recovered from the operation, became very active, and barked very loudly so that he could be heard all over the medical building.

June 12.—Six months after operation the dog weighs 30 pounds or 13-7/10 kilos. This loss of weight may have been due to the confinement in the laboratory without exercise out of doors. The food was not as nourishing in character during the last month as it was during the rest of the year. Dog was killed with ether. There were numerous adhesions between the operated lung and the chest wall, also marked anthracosis of both lungs. The fascia lata was united with the pleura covering the lung. No fluid in either pleural cavity. The pathologic report from Dr. Weller upon the lungs is as follows:

"Unoperated lung, marked anthracosis, some emphysema, otherwise practically negative. Site of operation: a subacute purulent inflammation. Small abscess. Healing progressing rapidly about the abscess."

Case XV. Operation: Resection of one lobe of left lung.

Result: Death in six days from empyema.

Operation February 10, 1915.—Dog weighs 23 pounds or 9⅘ kilos. Intratracheal insufflation and operation done under strict aseptic precautions. Resection of one rib. One lobe of left lung held by means of a pair of Kocher's gastro-enterostomy clamps covered with rubber tubing and the lung resected. Wound closed and covered with a strip of fascia lata. At one time the dog was threatened with asphyxia. Wound of skin sutured and covered with gauze and collodion. February 11, dog stands up in cage but appears quite sick, temperature 102.8°, respirations 50, pulse 160. There was slight emphysema over the left thoracic region.

February 12.—Examination of urine shows a small amount of albumin but no sugar, respirations 44, temperature 102.8°, pulse 140. February 13, respirations 70-80. I removed the gauze dressings and found the wound infected. After aspirating in several places considerable fluid escaped from the pleural cavity. Dog looks moribund.

February 16.—Dog died. Considerable fluid found in right pleural cavity and right lung looks mottled and dark in color, but floats in water. Left lung collapsed and covered with a fibrinopurulent exudate. Sutures and fascia in position. Lung sinks in water. Pathologic report from Dr. Warthin: "Marked hemorrhage, abscess. Marked purulent pleuritis. Collapsed lung shows very thick, organizing pleuritis."

Case XVI. Experiment; application of intratracheal insufflation without any thoracic operation.

Result: No ill effects.

February 24, 1915.—Black male dog weighs 19 pounds or 8½ kilos. Intratracheal insuffla-

tion at 20 to 28 millimeters pressure for twenty minutes. After the tube was removed, the dog breathed rather rapidly for a few minutes but later resumed normal respiration, and made a complete recovery without any ill effects. This experiment shows that the intratracheal insufflation in the absence of pneumothorax is not dangerous in itself if the proper pressure is used.

CASE XVIII. Operation: Resection of one lobe of left lung.

Result: Recovery.

April 19, 1915.—Small female dog weighs 22½ pounds. Number 21 French catheter passed into the larynx and trachea after the dog was anesthetized. Aseptic operation performed by Drs. Hayes and Cattermole. Resec-

Case XVIII. Taken two months after operation.

tion of one rib subperiosteally. One lobe of the lung was removed and wound carefully sutured after ligating the bronchioles and vessels. The lung wound was covered with a portion of the fascia lata. External wound closed and sealed with gauze and collodion.

April 20.—Dog doing well and shows no bad symptoms.

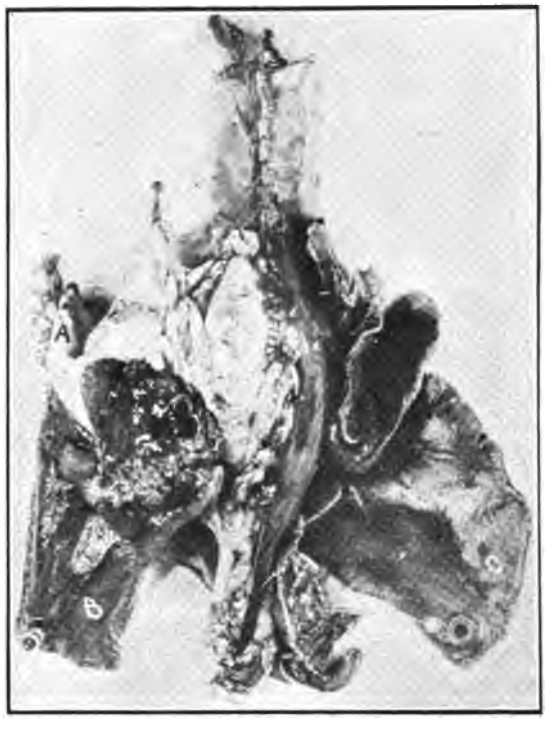
June 12, 1915.—Weight is 16½ pounds, or 7-3/10 kilos. emaciated in appearance, probably from confinement and inferior character of the food during the last month. Wound healed with very little scar tissue. Killed with ether and lungs removed.

Pathologic report Dr. Weller: "Unoperated lung; congestion, anthracosis, some alveoli appear overdistended. Operated lung: Sub-acute purulent inflammation. Embedded sutures. Organizing fibrinopurulent pleuritis."

CASE XVII. Operation: Resection of one lobe of left lung.

Result: Recovery.

April 9, 1915.—Black and white male mon-



Case XVII. Excision of middle lobe of left lung, viewed from behind. (A) Stump of excised lobe. (B) Left lower lobe. (C) Right lower lobe.

grel weighs 50 pounds. Number 24 French catheter passed into larynx and trachea after the dog was anesthetized. One rib resected

Case XVII. Taken two months after operation.

subperiosteally. Pressure 25 to 30 millimeters. Resection of middle lobe of left lung, under the same aseptic precautions as are used in any major operation in a modern hospital. Several

bronchioles ligated with silk and lung wound sutured with mattress stitches of silk and a strip of fascia lata sutured over it. There was no leakage of air after the lung suturing was complete. External wound sutured in layers and sealed with gauze and collodion.

April 10.—Respirations 30, dog doing well.

June 12.—Two months after operation. dog weighs 32½ pounds or 14-7/10 kilos; looks emaciated probably because of poor food and confinement. Killed with ether. Some small adhesions between the operated lung and the chest wall and between neighboring lobes of the lung. Fascia lata united over the lung.

Pathologic report from Dr. Weller: "Unoperated lung: Practically normal. Some emphysematous areas. Seat of operation: Areas of atelectasis. Sutures still remain. No positive traces of fascia lata. Inflammatory process practically healed."

CASE XIX. Operation: Resection of one lobe of lung.

Result: Death in four days probably from the effects of over pressure combined with infection from the distemper germ.

May 3, 1915.—Small brown female dog weighs 19½ pounds. Number 18 French catheter inserted into the larynx and trachea after the dog was anesthetized by the open method. One rib resected subperiosteally under aseptic precautions. Portion of left lung removed. Stump of lung carefully sutured and covered with a strip of the fascia lata. Dog stopped breathing occasionally but resumed it when the air pressure was reduced from 25 to 20 millimeters of mercury. The external wound was sutured in layers and sealed with gauze and collodion. There was some dyspnea when the tube was removed but the dog soon breathed regularly but about 50 to the minute.

May 6.—Respirations 48 to 50. There is a discharge of frothy mucus from the mouth. She stands up and drinks water.

May 7.—Dog died. Both pleural cavities are half full of fluid. In the left one is a very thick fibrinous exudate covering the entire lung with adhesions to the parietal pleura. The fascia lata was partly destroyed. There was no pus in the pleural cavity. The sutures in the lung were in position.

Pathologic report from Dr. Weller: "Ligature in lung surrounded by area of hemorrhage and necrosis, gangrenous around one ligature. Lung shows atelectasis, hemorrhage and general pneumonia. Fibrinopurulent pleuritis. Other lung shows hemorrhagic area, some areas atelectatic, others emphysematous."

SUMMARY OF THE ABOVE NINETEEN CASES.

Case I. Pneumectomy. Recovery.

Case II. Pneumectomy. Death, 5th day. Empyema.

Case III. Pneumectomy. Death, 2nd day. Pneumothorax.

Case IV. Pneumectomy. Death, 30th day. Empyema.

Case V. Pneumectomy. Death, 3rd day. Pneumothorax.

Case VI. Pneumectomy. Death. 6th day. Pneumothorax.

Case VII. Pneumectomy. Death, on table. Paralysis of Glottis.

Case VIII. Pneumectomy. Death, 2nd day. Pneumothorax.

Case IX. Pneumectomy. Death, 2nd day. Over-pressure.

Case X. Pneumectomy. Death, on table. Pneumothorax.

Case XI. Pneumectomy. Death, 7th day. Over-pressure empyema.

Case XII. Pneumectomy. Death. 2nd day. Over-pressure and distemper.

Case XIII. Pneumectomy. Death 3rd day. Distemper.

Case XIV. Pneumectomy. Recovery.

Case XV. Pneumectomy. Death, 6th day. Empyema and distemper.

Case XVI. Application of insufflation. Recovery.

Case XVII. Pneumectomy. Recovery.

Case XVIII. Pneumectomy. Recovery.

Case XIX. Pneumectomy. Death, 4th day. Over-pressure and distemper.

There were eighteen lung operations and four recoveries.

CONCLUSIONS.

Many of these experiments were failures because it was necessary to develop the technic by careful experimentation before successful surgery upon the lung could be done. An examination of these results will enable one to form an adequate idea of the difficulties that must be overcome in performing operations upon the lungs. As the majority of the dogs operated upon were afflicted with canine distemper the mortality is necessarily much higher than it would have been if healthy animals could have been obtained for this work. A careful study of these results warrants the following conclusions:

Intratracheal insufflation was not without harmful effects upon the lungs even in those dogs who recovered. Interstitial emphysema and overdistension of some of the

alveoli of the lung were shown microscopically. These changes were much more marked in those animals that died than in those that recovered and consisted of large hemorrhagic areas with tearing of the walls of the alveoli. Insufflation also has a very harmful effect upon the circulation in the lungs as is shown by the intense congestion and atelectasis found microscopically. In applying this method of anesthesia to intrathoracic operations upon the human being great care must be exercised in order to have the pressure high enough to prevent pneumothorax and still not so high as to cause serious damage to the circulation in the lungs or to cause a severe degree of interstitial emphysema.

The transplantation of a strip of fascia lata upon a wound of the lung gives an added protection to it from infection. Preliminary ligation of the bronchi and careful suture of the lung tissue must always be done. After the suturing is complete careful search must be made for the escape of air from the lung wound by moistening it with salt solution. If any air escapes the wound must be re-enforced by additional suturing. For intratracheal insufflation a catheter of number 18 to 24 French should be used and the pressure should be maintained at 20 to 25 millimeters of mercury.

I desire to thank all those who assisted me in these experiments and especially Dr. Warthin for the examination of the pathologic material and the preparation of the photomicrographs which form a part of this article.

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DISCUSSION.

Dr. Cyrenus G. Darling: I am sure that we are very grateful to Dr. Georg for presenting this experimental work, since he has demonstrated the dangers incident to this class of surgery. Fortunately we are not called upon very often to operate upon the lung. The lung is an organ of wonderful reparative powers and is able to care for the results of trauma or infection without the necessity of direct surgical interference. The cases suitable for operative work in the human being would probably do about as well if treated conservatively as if more radical procedures were employed.

Dr. R. Bishop Canfield: I have been interested chiefly in noting the effect of insufflation anesthesia upon the lung. This method was adopted quite extensively in Germany a few years ago when other methods of anesthesia might equally well have been employed. It is very interesting to note that these patients according to these experiments were exposed to considerable danger due directly to the method of anesthesia. I have seen patients prepared for mastoid operations anesthetized by insufflation anesthesia, with perfect recovery, and it is enlightening to see the amount of destruction that may come on in the lung from pumping into it, even though the patients recover.

Dr. Georg: This method of anesthesia is not being used as much at present as it was at the start because of the dangers found to be connected with it. There are very few cases that actually require it in the human being, and as Dr. Darling mentioned, there are very few cases requiring lung surgery.

REPORT OF A CASE OF LARYNGEAL CRISIS IN TABES DORSALIS.

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Mrs. H. age 43, entered the Neurologic Clinic of the University Hospital September 18, 1915 complaining of inability to walk, numbness from the waist down and severe pains all over her body. I wish to report a laryngeal phenomenon which occurred in this patient during her stay in the Hospital and acknowledge my indebtedness to Dr. Camp for the privilege of placing on record this interesting case.

The family history is not important. The patient had the usual diseases of childhood and says that she had syphilis about fourteen or fifteen years ago. She gives a history of a rash. She has been married twice, her first husband dying of dropsy at the age of twenty-one. Her second husband is living and fairly well. She has had three children all by her first husband, and three miscarriages by her first and one by her second husband.

The present trouble began eight years ago with sharp shooting pains all through her body, numbness and weak feeling in her bowels, and numbness and weakness over her lower extremities. She said she would often drop down suddenly, her knees apparently giving way. She has had incontinence of urine and feces. The neurologic examination by Dr. Camp in brief is as follows:

"The patient is somewhat emaciated. She has some enlarged glands in the neck. The pupils do not react to light but do react in accommodation. The extraocular movements are normal, no nystagmus. The tongue protrudes straight, no tremor, no atrophy. Test words are pronounced well. There is no atrophy nor deformity of the arms or hands. The biceps jerks are not obtained on either side. The knee jerks are absent. The Achilles jerks are absent. She walks with two canes saying one would not suffice. Her gait is ataxic."

On lumbar puncture a clear and colorless fluid was obtained with 55 cells per cubic millimeter. A carbolic test was double plus. Nonne-Apelt: phase 1 and 2 positive. The Wassermann test on the blood and spinal fluid was reported strongly positive. A diagnosis of tabes dorsalis was made and the patient placed on treatment.

Previous to her entrance into the Hospital, the patient cannot recall having had any trouble with her larynx. No note of laryngeal involvement is made in her neurologic examination. On November 20 while eating supper the patient suddenly developed a severe spasmodic attack of coughing accompanied by marked inspiratory dyspnea. She became cyanotic and respiration ceased for a time. Emergency treatment was instituted. The patient's tongue was drawn from the mouth and artificial respiration resorted to. I was called and reached the patient about ten minutes after the attack started. The patient had resumed breathing but was still having marked difficulty in inspiration. She was in a marked state of excitement due to the impending danger of suffocation. Her face was congested and dusky and the eyes were very prominent. Occasional momentary fits of coughing accompanied this stridor. After I arrived the patient exhibited one pronounced attack of coughing lasting for about two minutes. She attempted to tell us something was irritating her throat, threw herself on the bed, her costal and abdominal muscles of respiration and the muscles of her upper

and lower extremities being thrown into spasmodic contraction. At no time did the patient lose consciousness. The series of attacks lasted about twenty minutes after which the patient became quiet and resumed her meal. On the following day she felt well, her only complaint being that of slight soreness in the region of the larynx, due no doubt to the irritation from coughing.

The patient describes the attack as follows: On taking the first bite of a sour pickle, she suddenly began to cough; thinking that she had aspirated a portion of the pickle, she conveyed this impression to the nurse whose attention was attracted by the coughing. For this reason the case was considered one of a foreign body in the respiratory tract. The patient did not succeeed in coughing up the foreign body nor does she recall swallowing it. Examination of the throat and larynx by palpation and indirect method was negative. No signs of foreign body in the respiratory tract could be elicited on physical examination of the chest at that time or on the following day. Examination of the larynx later was negative with the exception of a slight redness and thickening of the mucosa over the arytenoid processes and slight thickening of the vocal cords. There was no paralysis either on forced inspiration or phonation. In talking with the patient later she stated that the attack of coughing began the moment she inhaled the vinegar fumes from the pickle. Following the examination of the throat and chest and knowing the previous neurologic history of the patient, a diagnosis of laryngeal crisis in a case of tabes dorsalis was made.

In making a differential diagnosis, an attack of coughing due to the aspiration of a foreign body and a hysterical attack must be considered. In this case no foreign body could be found and the attack was too long and too severe to be attributed to this cause. No stygmata of hysteria are mentioned in the neurologic examination. Such an attack in a child would also suggest croup or laryngeal vertigo.

The occurrence of tabetic crises has long been known. Gastric crises characterized by intense paroxysms of pain and vomiting are the most common. Laryngeal crises are next in frequency according to Osler. Cases exhibiting cardiac, bronchial, nasal, ocular, nephritic, uterine, clitoral and rectal crises have been reported. Authorities are quite well agreed that laryngeal crises are probably due to acute spasm of the adductors of the larynx. According to Grünwald the cords are fixed in adduction and the spasm is accompanied by coughing, marked dyspnea and loud inspiration. Oppenhein states that the requisites for a tabetic crisis are: First, a sensory irritation; second, a motor spasm and third, a hyperthesia of the parts affected. Very few authentic cases have been placed on record. The first case reported was that by Ferrol in 1868. In 1907 W. B. G. Harland of Philadelphia read a paper before the section of Otolaryngology at the annual meeting of the American Medical Association entitled "The Larynx in Locomotor Ataxia." In preparing this paper Dr. Harland examined many hospital patient and says, "I have been unable to find a case of laryngeal crisis and neurologists of my acquaintance tell me that this condition is extremely rare. Laryngeal paralysis is the most common manifestation of tabes in the larynx and is usually central. There is no apparent relation between laryngeal paralyses and laryngeal crises. They may occur in combination or independently. Davis reports a case of laryngeal crisis with abductor paralysis."

Touche in examining forty cases of tabes reports twelve with laryngeal crises. Green reports seven cases in examining sixty cases. Three of these were without evident paralysis of either cord.

The majority of cases have occurred in females. In many of the cases there is a history of a sensation in the throat as of a foreign body. The inhalation of irritative gases is given as an exciting factor. The duration and intensity of the attacks vary. Moore and Martin report fatal cases of laryngeal and bronchial spasms in which tracheotomy was performed, death resulting ten days later. Cases are reported in which the patient became unconscious.

In the present case, no treatment was instituted and the patient made an uneventful recovery. The use of cocain as a local application in the larynx, the use of morphine hypodermatically, bromides by mouth, and the use of ether and choloroform have been recommended in treating laryngeal crises.

This case is placed on record as a rare manifestation of tabes. Laryngeal tabetic crises as a rule occur as a late manifestation of the disease and for this reason their diagnostic value is not great. Coakly, however, suggests that in cases of laryngeal spasm, in adults, in the

absence of a history of a foreign body, a careful examination for other signs of tabes should be made.

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DISCUSSION.

Dr. R. Bishop Canfield: The question of laryngeal crisis is interesting chiefly because these crises appear rarely and when they do their etiologic factors are frequently confounded, a perfectly innocent cause being ascribed to a very dangerous complication, or vice versa. They occur chiefly in laryngoplegic migraine, a rare occurrence in which there is a migraine, a laryngeal paralysis and a crisis. These occur in varying degrees of severity, in some the headache being the most prominent factor, while in others the crisis is the most prominent factor. In these cases there is sometimes a very definite paralysis usually an abductor paralysis, that is, one with the cord in the position of phonation. They occur also in laryngeal vertigo, in status lymphaticus, in tabes and finally in foreign body cases. Laryngeal crises in children are very frequently fatal. I have seen three or four children in whom the diagnosis of foreign body had been made because of the fact that the crisis came on while eating. A child previously healthy, 8 or 10 years old, at dinner suddenly has a paroxysm of coughing, no cyanosis, weak and rapid pulse, and death in the course of a few hours or days. Several such cases have been brought to the Hospital with the diagnosis of a foreign body.

The crisis of hysteria differs chiefly from these in that there is usually no cyanosis. The patient breathes just enough to maintain a normal color. The question of the condition of the larynx during these crises has never been made out because no one has been able to see the larynx during the crisis. This case is also interesting because so far as I know it is the first one which has been observed in this Hospital.

THE STARVATION TREATMENT OF DIABETES.

Mark Marshall, M.D.

Instructor in Therapeutics and Materia Medica, University of Michigan.

On account of the lateness of the hour I will try and be brief. Before considering the starvation treatment of diabetes I would like to review briefly the older methods of treatment. They provided in the milder cases for the restriction of the carbohydrates to a point where sugar does not appear in the urine. In the more severe cases the proteins are also reduced in order to keep the patient sugar free. Every effort is made to make the patient gain weight, the latter being regarded as an index to the progress that the patient may be making.

We are indebted to Dr. Allen of the Rockefeller Hospital for what seems to be a radical improvement in our methods of handling diabetes. Dr. Allen experimented upon dogs. He removed portions of the pancreas, taking care in each instance to preserve the pancreatic duct in order to avoid atrophy of the gland. He was thus able to produce cases of glycosuria of varying severity depending upon the amount of pancreatic tissue removed. These animals furnished interesting subjects for dietetic experiments. He found, as had been previously observed, that they were benefited by short periods of starvation. In the past we have been in the habit of starving patients for a short time, but generally the starvation consisted in the so-called green diet which would give the patient about 800 calories a day. Allen found that even the severe cases if starved completely would become sugar free, and to his surprise, there was no tendency to acidosis. He found later that by keeping the diet at a low point after the starvation that they did not show the tendency to develop the glucosuria that they did when the diet was a full one. He not only reduced the carbohydrate but also reduced the proteins and fat in the diet. The animals were maintained at a low level of metabolism, and were kept permanently under weight. These principles were then applied to human beings. Dr. Allen asked that the most severe cases of diabetes be sent to him for treatment. It required from one to ten days to get his various patients sugar free. After they were sugar free he continued the starvation for one or two days. Then small amounts of food were started beginning with

fats and proteins. Later carbohydrates were added. The patient's tolerance for carbohydrates and proteins was determined. In all instances the metabolism was reduced and the patients kept under weight. With the older methods we always attempted to maintain a normal weight.

A recent addition has been made by Dr. Allen to his method of treatment, namely, the introduction of systematic exercise. His experimental work on animals showed that if the animals were exercised, forced to work in a tread mill, that the tolerance for carbohydrates would increase. He further showed that the sugar in the blood was reduced and even in some of the severe cases it never returned to the high point at which it stood previous to the introduction of exercise. This point has been introduced in the treatment of human beings. It does not increase the patient's weight but does increase the muscular strength. The diabetic patient is changed from a neurasthenic to an athletic type.

Dr. Allen points out certain incidental, but nevertheless important. advantages of the starvation treatment. First, it shortens the patient's stay in the hospital. Second. it gives him immediate encouragement because he becomes so quickly sugar free as a result of which he is more willing to submit to dietetic restrictions.

We have tried the treatment with pretty good results in the University Hospital. Any failures which we may have had were due, I am sure, to our not following strictly the régime advocated by Dr. Allen, who advises that in any instance where the glycosuria returns, that the patient be immediately starved until the sugar disappears. The latter is a point which we have not observed as carefully as we should. Our results for the most part are excellent. Our cases have become sugar free in a short time, in most cases about three days, in one case seven days. This method is still in the experimental stage but it bids fare to upset many of our previous ideas concerning the treatment of diabetes.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, January 12, 1916

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

A HISTORY OF FAMILY CATARACTS THROUGH FOUR GENERATIONS.

WALTER R. PARKER, M.D.
(From the Clinic of Ophthalmology, University Hospital, Ann Arbor, Michigan.)

While it is unusual to be able to establish a hereditary factor as a cause of cataracts, every now and then reports of family cataracts running through several generations point to a true hereditary influence. The late Mr. Nettleship devoted much time to the study of this subject and we are indebted to him for the tabulation of many remarkable family histories.

The most common congenital defect in the formation of the lens is that known as the lamellar or zonular cataract. It is a form of cataract which develops just before or shortly after birth. The opacity occurs in two or more contiguous lamellae of the lens fibers enclosing a clear or partly opaque nuclear portion of the lens substance. The degree of opacification varies from that in which the opaque zone at its equator can be just distinguished to a density through which no red fundus reflex can be seen. (Weeks.)

The age at which cataracts occur in members of a family affected is generally about the same. Nettleship, however, in a large series of cases makes out a good case for "anticipation," the cataracts in many cases tending to appear earlier in each generation. But as Dr. Callan says in Wood's Encyclopedia, "It must be remembered that the beginning of cataracts is more likely to be discovered the nearer one approaches the present time. This is true not merely because methods of observation are more precise and medical men are more prone to make careful examination of eye conditions than formerly, but because the younger patient knows there had been an unusual number of cataractous eyes in his family and is more likely to be on the watch for early signs of oncoming blindness than one whose family eyesight in the past has been good."

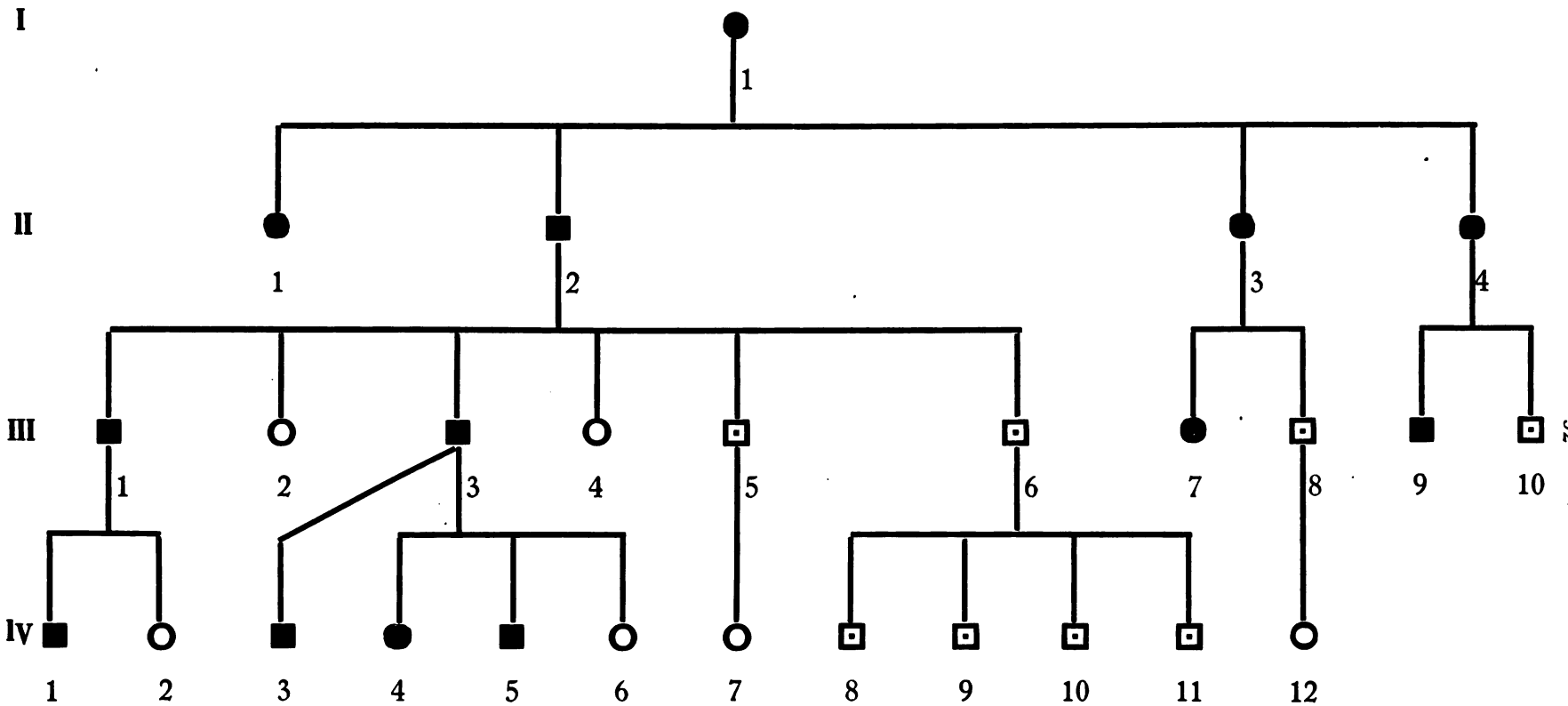
The family whose history I wish to present represents four generations including twenty-seven members, thirteen of whom had cataracts. (Fig. I.)

I. The original parent was known to have had cataracts, but no details as to their nature or time of onset are available.

II. The second generation presents a childship of four, three males, Nos. 1, 3 and 4, and one female, No. 2. All had cataracts coming on early in life.

III. In the third generation there was one childship of six members, two males, Nos. 2 and 4, and four females, Nos. 1, 3, 5 and 6. Of the females, Nos. 1 and 3 had cataracts, No. 1 coming on at the age of 12, and No. 3 at the age of 7. Second childship of two members, one male No. 7, and one female No. 8. No. 7 had congenital cataracts. Third childship, two females, Nos. 9 and 10. No. 9 had cataracts coming on in infancy and was operated on December 19, 1904.

IV. In the fourth generation there was one childship of two members, one female No. 1, and one male No. 2. Female had cataracts at the age of 14, with a history of poor vision since birth. Operated July 8, 1912. Second childship of four members, two marriages, one female by the first marriage, No. 3, had cataract at the age of 8, died at the age of 24. Three members by the second marriage, two males, Nos. 4 and 6, and one female, No. 5. One male, No. 4, had cataracts since childhood and was operated on October 18, 1915. One female, No. 5, discovered cataract at the age of 17 and was operated on July 14, 1914. Third childship of one male, No. 7, unaffected. Fourth



Male.
Female.
Cataract.

Fig. 1.

childship of four females, Nos. 8, 9, 10 and 11, all unaffected. Fifth childship, one male, No. 12, unaffected.

In regard to the sex most often affected, Nettleship shows that family cataracts more often descend through the female members and that they tend to select one sex to the exclusion of the other. He also observes that when cataract affects more than one generation irrespective of age, development, or variety, it usually descends from parent to child, and does not skip a generation, that is, they are direct and sex limited.

The inheritance in the family here reported was from female to female in five cases, from male to male in five cases, and from female to male in one case, and from male to female in two cases.

As far as could be determined there were no instances of other congenital defects and not a common incident was present apart from the occurrence of cataract, except myopia which was present in all four patients on whom I operated. There was no consanguinity of parentage. Wassermann was negative in three cases. The urine in the four cases examined was normal.

Whether the possibility of familial cataracts depends on an anomalous development of the nutrition of the lens or some systemic peculiarity common to members of the affected childship is not known. The nature of the development of the cataract also is still in doubt. While it is thought by some to be congenital, others think it develops as a rule during the first years of life.

It has been observed that very many patients with lamellar cataract suffer from convulsions during infancy. Rickets, too, has been thought to have an etiologic connection. Indeed it has been reported by Reuhr that 88 per cent. of 153 cases of lamellar cataract showed signs of rickets.

It is claimed the noxious quality of the disease induces the morbid changes in those layers of the lens that are present, or in process of formation at a certain time. This contention is borne out by the fact that lamellar cataract is rarely seen in countries in which rickets is rare. In spite of this apparent relationship however, it has not been proved that this disease is a true cause of this form of cataract. There has also been some evidence to show that tetany is responsible for their development.

No one of the cases in the family here reported came under observation as a child, but no history of rickets or tetany has been established. The history in this respect, however, is not complete.

DISCUSSION.

Dr. George Slocum: The phenomenon of heredity in diseases of the eye is very interesting and is not uncommon. A few years ago two sisters came to this clinic both having aniridia and congenital dislocation of the lenses. The family history was that the mother was born with aniridia and one sister and a brother had partial aniridia. Less extensive hereditary colobomata are frequently encountered. Hereditary retinitis pigmentosa is particularly interesting because of the fact that the unaffected daughters usually transmit the disease to the male children, the females in each generation usually remaining unaffected. Coraliform cataract, a peculiar form of congenital cataract, has been shown to be hereditary and the genealogy of a family of sixty-eight individuals in five generations, twenty-nine of whom had cataracts, was reported by Nettleship. The hereditary nature of several other conditions seems also well established; even some types of refractive error, notably high degrees of astigmatism, have repeatedly shown an undoubted hereditary tendency.

SARCOMA OF THE BREAST.

George D. Sutton, M.D.

(From the Surgical Clinic, University Hospital, Ann Arbor, Michigan.)

This evening I wish to report two cases of sarcoma of the breast. Case 1, Mrs. C. B., age 73, who entered the Surgical Clinic of the University Hospital October 26, 1915 for treatment of a large and painful mass in the left breast. Her family history is negative.

Her personal history shows that she had measles at the age of 5 with good recovery. Her menses started at 13 and were irregular until the age of 16. She was married at 23 and had two miscarriages which were induced during the second month. The menopause occurred at 40, the change gradually taking place and causing practically no trouble. Since then there has been no discharge of any kind.

There is a large goiter which first made its appearance during girlhood and is now smaller than it has been during the past few years. The right lobe is larger and is of cystic consistency. She has experienced exophthalmic symptoms.

Over forty years ago a small hard mass, the size of a hen's egg, appeared in the right lower quadrant of the left breast. It grew slowly but gradually with no pain and practically no inconvenience to the patient. About two and one-half years ago it began to grow more rapidly and at that time was about the size of a lemon. One year ago it was the size of the patient's fist and

from this time on attained its present size. Pain has been experienced only during the last year, and then at the spreading borders of the growth and was very sharp and lancinating in character.

When she entered the Hospital the tumor mass was supported and carried in a sac which was improvised from underclothing. During the last forty years no one was permitted to see the growth until two weeks before she entered this Hospital. The pain gradually be-

Case 1. Sarcoma of the Breast.

came very severe and two large purplish spots appeared which seemed about to ulcerate. Being unable to pick her plums as usual, and having to hire a boy for this purpose she finally sought the services of a local physician who advised immediate surgical treatment, the patient up to this time having had no idea of an operation.

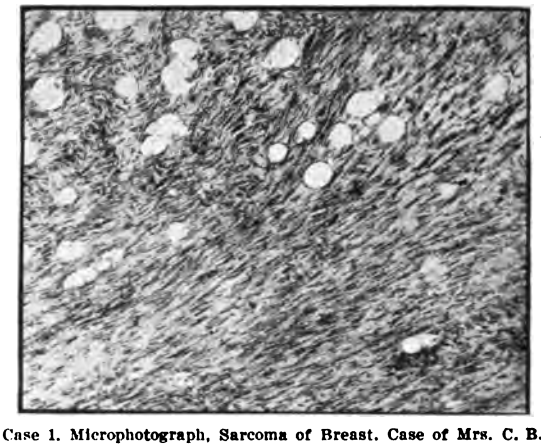
Examination showed a large tumor of the left breast which was nearly one and a half times the size of the patient's head. It was movable and not closely adherent to the deeper structures of the chest wall. Its base was five inches in diameter, greatest diameter fourteen inches and height eight inches. It was lobulated and at the border were softer tender nodules which were of more recent development and caused the greatest pain. In the region of the nipple there was a mass the size of a hen's egg.

The skin over this tumor was smooth, tense, and shining, and contained large, dilated, radiating veins, and a vast network of smaller vessels. Very slight injury had caused profuse hemorrhage. There was no evidence of clavicular or axillary glandular involvement. In a reclining posture the tumor mass rested on the left arm, but when sitting erect it extended directly forward, thus allowing comparatively free use of the arm.

She was not emaciated but was partially deaf and afflicted with palsy. Blood; Hgl. 90, R. B. C. 3,540,000 W. B. G. 9,500. Serologic test, Wassermann negative. Urine negative with the exception of a few hyaline casts. Otologic examination showed senile auditory nerve atrophy. Dental surgical examination showed pyorrhea.

The patient was operated upon by Dr. Darling, October 30, 1915. A very light ether anesthesia was administered because of myocarditis and very irregular pulse which tended toward the perpetually irregular type. The lung examination was negative. An incision was made sufficiently high at the upper and lower border of the tumor to insure the meeting of the flaps. On removal of the mass from the muscle from above downward no evidence of infiltration was observed. By inserting hemostats into the tissue which was put on a stretch and just ahead of the knife, the hemorrhage was easily controlled.

Immediately after the removal of the tumor,



Case 1. Microphotograph, Sarcoma of Breast. Case of Mrs. C. B.

which weighed ten pounds, pressure and hot packs were applied to the precordium, then gradually removed in an attempt to prevent a sudden embarrassment of the heart action. The wound was closed with silkwormgut sutures.

Since the patient was a bad risk speed was indicated. The pulse before anesthesia was 86 and after 88 and of fair quality. The skin, however, became very cold and was slightly covered with cold perspiration but quickly cleared up. The time taken to remove the tumor was

fourteen minutes, the time necessary to complete the operation was twenty-four minutes and the duration of anesthesia, twenty minutes.

The gross pathology of this mass showed an encapsulated elipsoidal tumor which was firm, lobulated and possessed areas of cystic degeneration. The cut surface was grayish white and the numerous lobules were made up of whorls of connective tissue cells giving it a wild appearance. Microscopic examination showed many large spindle cells and no evidence of glandular elements. There was a lack of system in the arrangement of the cells which gave an indication of their wild and rampant growth.

She experienced an uneventful recovery and was discharged on the fourteenth day, cured from her surgical condition.

Case 2, Mrs. D. C., who entered the Surgical Clinic, January 24, 1912 because of a tumor of the right breast. Her family and personal history was negative. She was operated upon by Dr. Darling, January 25, 1912 who performed a radical operation of the breast and axilla.

The pathologic report on this tumor showed a cystic adenofibroma of the breast with sarcomatous stroma. There were small metastases in the lymph glands of the axilla.

On the twelfth day she was considered cured from her surgical condition and discharged.

A graphic description of breast sarcoma has been given by Creighton as follows:

"A tumor of the breast will be diagnosticated sarcoma if it bulges out as a globular or ovoid or spherical mass carrying the nipple erect upon its summit or at one side; distending the skin which is often red or livid, glazed, thin and ready to burst, having a definite rounded contour wherever it can be felt, nodulated or lobed, feeling tense or elastic, of rapid growth; or, if it has burst through the skin, making a bleeding fungus with overhanging edges or a fleshy lobulated knob or button covered with a fleshy pellicle. On section it will be found uniformly grayish or fleshy, separated into rounded or oval lobes or into convolutions, with a lobulated or scalloped margin, encapsulated, vascular, interspersed with areas of extravasated blood or of blood pigment, or with opaque yellowish or sand colored tracts, or with friable necrotic centers; if there be much mamma left, it will be borne upon the surface of the tumor at one or more sides as a distinct stratum." (Cancers and Other Tumors of the Breast, Williams and Norgate, London, 1902). (Treatise on Tumors, Hertzler, 1912).

Much of the literature on breast sarcoma comprises only isolated case reports and one is impressed with the relative rarity of this disease.

Dr. Armstrong reported a case of sarcoma of the breast in the *Montreal Medical Journal*, April, 1903. "A woman, aged 35, entered the hospital complaining of the size and weight of the left breast, and also of free hemorrhages from it on several occasions. The growth had begun as a hard and painful lump, the size of a walnut, just to the inner side of the left nipple. It increased to the size of the fist by the end of the first year. From then on it grew rapidly and became softer and three months before admission, hemorrhage occurred to the extent of two quarts according to the patient's statement. Following this there were frequent hemorrhages." Dr. Armstrong removed it very freely, together with a few glands from the axilla showing inflammatory enlargement.

The tumor was benign for the most part and weighed about four pounds. It was of fibrocystic nature and supposed to be innocent up to the time of rapid enlargement. However, sarcomatous cells could be found in distinct masses in very many places and are supposed to have been the cause of the rapidity of growth.

At the same meeting Dr. Keenan reported a case where there was a clear history of fibroadenoma having been present for ten years and then rapid enlargement following a slight injury. The growth proved to be fibroadenoma with sarcoma cells invading it.

The following case of sarcoma of the breast was reported at the meeting of the Clinical Society of the University of Michigan, January 2, 1907 by Dr. Frank A. McJunken.

Miss P., age 47, was admitted to the Surgical Clinic, November 23, 1906 for treatment of tumor of the breast. Six years previously she noticed that the right breast was hard in consistency and somewhat larger than the left. It grew gradually but slowly up to July, 1906, but during the remaining four months it grew much more rapidly. Examination showed a growth the size of the patient's two fists and fairly movable and apparently encapsulated. A part of the mass was cystic while the remainder was of a solid consistency.

Microscopic examination showed the presence of sarcomatous cells.

Dr. S. H. Geist and Dr. A. O. Wilensky report, in the *Annals of Surgery*, July, 1915, five hundred and fifty-eight cases of breast tumor including chronic inflammatory growths both simple and specific from the Mount Sinai Hospital, New York, during the last ten years.

"Of these, twenty-two or 3.9 per cent. were sarcomata; two hundred and sixty, or 46.5 per cent. were carcinomata. The twenty-two sarcomata were grouped as follows: fibromyxosarcoma, five; spindle cell sarcoma, five; round cell sarcoma, four; cystosarcoma phylloides, four; giant cell sarcoma, two; and perithelioma, two. The fibromyxosarcoma and spindle cell sarcoma are the most common types. The tumors occurred in women between the ages of forty-nine and twenty-nine, thirty-nine being the average. In 57 per cent. the right breast was involved, in 33 per cent. there were bilateral tumors, and in 10 per cent. there was involvement of the left breast. The duration of the tumors varied from one week to nine years and there was a variation in size from that of a walnut to that of an adult's head. In one-third of the cases the skin was fixed to the tumor."

The frequency of sarcoma of the breast is considered by Rodman (*Journal American Medical Association,* 1911) at 2.7 per cent. In six hundred and ninety-four tumors of the mammary gland, Bloodgood (Kelly and Noble, Gynecology and Abdominal Surgery, 1908) found fourteen cases of sarcoma or 2.01 per cent. Out of three hundred and fifty-five cases of mammary tumors Poulson (*Archiv f. Klin. Chir.,* 1891) reports thirty-three cases of sarcomata or 9.2 per cent. (Reference "Treatise on Tumors" Hertzler, 1912).

Sir Roger Williams (Diseases of the Breast, 1894) analyzed 13,824 primary neoplasms of the breast (males, 4,593; females, 9,227); 1,081 were sarcomata (males 559; females 552) and only ninety-nine were sarcomata of the breast (males 5; females 94). He found 9.4 per cent. of the body neoplasms to be sarcomatous, and only 3.9 per cent. of tumors of female breast to be sarcomata. As compared to cancer of the breast it is rare. He analyzed 2,397 consecutive neoplasms of the female breast and 1,863 or 77.7 per cent. were cancers, while only ninety-four or 3.9 per cent. were sarcomata, thus showing the greater stability of the connective tissue elements of the gland. He also found that 54.5 per cent. of all neoplasms were cancers and of these 77.7 per cent. were cancer of the mammae; 9.4 per cent. of all neoplasms were sarcomata and of these 3.9 per cent. were breast sarcomata. This shows the relative frequency of cancer in the female breast and that it is high above the average while the frequency of sarcoma is far below the average.

"Sarcoma of the breast may have its origin in the intralobular hyaline connective tissue, or in the denser interstitial fibrous stroma surrounding the gland or it may be a metastasis from a distant primary growth, e. g., the ovary or tonsil. Instances of all the various cellular varieties have been reported but with the exception of the spindle cell type they are of extreme rarity. The most common variety is that which develops from the intracanalicular myxoma which in their later stages tend toward malignancy." (Keen, System of Surgery, Vol. III, 1908).

It is thought by Johnson to be a dangerous delusion and unsurgical procedure to amputate the breast without clearing out the axilla. Also, that sarcoma invades the lymph vascular system very nearly as quickly as carcinoma and that no reliance can be placed on the supposed absence of the glandular involvement. (Johnson, Operative Surgery, 1915).

"The complete removal of the breast and the greater pectoral muscle should be practiced in every case. In the case of small sarcoma the excision of the tumor with a good margin of healthy breast tissue may suffice but where any doubt exists the complete operation should be employed. One should never temporize or compromise with malignant growths." (Keen, System of Surgery, Vol. III, 1908).

The first case (Mrs. C. B.) reported in this paper illustrates the fact that all tumors of the breast are potentially malignant, and that not only do malignancies arise from glandular elements but very malignant growths may arise entirely from connective tissue elements. The second case (Mrs. D. G.) teaches us that sarcoma is not only conveyed through the blood stream but also by way of the lymph vascular system.

DISCUSSION.

Dr. Walter A. Hoyt: I have taken the pains to look up the number of cases of malignant disease of the breast which have occurred in the University Hospital during the past five years to establish the frequency of sarcoma in the relative small number of cases. In the last five years we have records of 135 cases of malignant disease of the breast. Of this number only two were definite sarcomata of the breast. Practically all of these growths were examined microscopically and were carefully studied. This would give a percentage of not over 1½ per cent. These figures would lead to the conclusion that in this Clinic, at least, sarcomata are not as frequent as reported elsewhere. (3.9 per cent.)

The interesting point in Case 1, is the long duration of the tumor up to the time that there was any noticeable change, and also the length of time that this patient concealed the presence of the tumor in the breast. It took a good deal of tact even after she entered the Hospital to persuade

her to submit to an examination. She was very sensitive and at the last moment was even going to give up and not let us examine her after she had come a couple of hundred miles to the Hospital for operation.

The question of axillary involvement is also interesting. The older and many of the newer text books say that there is no axillary involvement in sarcoma of the breast. However, a good many cases of such involvement have been reported. In Case 1 it was impossible to palpate any axillary glands which is also true of a large number of carcinomata of the breast. In such cases, however, when the axilla is opened up large glands are found under the pectoral muscle. A radical operation was not performed on the first patient for the simple reason that we were positive the patient would not be able to stand it. The mass was removed as a palliative procedure, of course with the hope that a cure would result. Had this tumor remained the patient would have had severe hemorrhages, similar to the one she had, and eventually the bleeding would have caused her death.

Dr. Reuben Peterson: I would like to ask Dr. Sutton in closing the discussion if he will give us statistics with regard to the recurrence of this kind of tumor of the breast.

Dr. Udo J. Wile: I should like to ask a question bearing on the pathology of this tumor. It struck me as I examined it that it was not very cellular. It is almost inconceivable, as far as my pathologic knowledge goes, for a round cell, or for a giant cell sarcoma to have existed as long a time as this without having long before that caused the patient's death. I would like to know if this was not distinctly a fibrosarcoma and very acellular.

Dr. Sutton: The pathologist reported that it was a spindle celled sarcoma.

Dr. Wile: I think that is a very striking feature.

Dr. Sutton: Statistics show that about 75 per cent. of the patients operated upon are cured by the operation. There are recurrences, however, and by succeeding operations, cures are often obtained.

REPORT OF A CASE OF MULTIPLE CARCINOMA WITH INVOLVEMENT OF THE BRAIN.

Albert M. Barrett, M.D.

(From the Clinic of Psychiatry, University Hospital, Ann Arbor, Michigan.)

The report and demonstration which I wish to make concerns a case which was at the Psychopathic Hospital a few weeks ago.

The patient was a woman who had always been comparatively well until she was 33 years of age. The only previous disturbances had been occasional attacks of biliousness since her youth, and an injury to her left eye which left a permanent cicatricial contraction of the pupil. In 1914 she had an epithelioma removed from the left forearm.

About July 1, 1915, she complained of headaches and showed an unusual amount of worry over her household work. She had frequent attacks of severe vomiting. From this time on her health deteriorated. The headaches continued and there were several attacks of vomiting each week. She appreciated that she was not mentally normal. She became unable to do the intellectual work that she had formerly done, and as she expressed it. "All sorts of fancies and fairy tales are passing through my head." Her vision became impaired and she became unable to do more than simple tasks.

On October 30 the wagon in which she was riding was struck by an automobile. She had no direct injury but was unusually nervous after the experience. In a few days there was a partial motor and sensory paralysis on the right side. The weakness was more marked in the leg than in the arm. At times she was unable to express herself because of a speech disturbance. These conditions brought about her admission to the Psychopathic Hospital on December 6, 1915.

A satisfactory physical examination was much interfered with owing to the deep stupor of the patient and consequent lack of any coöperation.

The laboratory examinations showed nothing pathologic in the urine. There was a leucocytosis of 11,450-13,500. The cerebrospinal fluid showed greatly increased pressure. The albumin was slightly increased, measuring about twice the normal amount. The Nonne-Apelt and Noguchi tests for globulin were weakly positive. The cells numbered eight per cubic millimeter. Lange's colloidal gold test was negative. The Wassermann reaction on the fluid and on the blood was negative.

At the time of her admission on December 7, 1915, she staggered as she attempted to walk and would fall if unsupported. Both eyeballs were prominent and vision was much diminished.

Mentally she understood questions when these were put forcibly but her replies soon rambled into disjointed and irrelevant remarks. Spontaneously she kept up a continuous talk, made up largely of fabulations of her personal and domestic experiences. In her speech there were often paraphasic disturbances and some perseveration. Objects placed in her hands were often miscalled; her reply was usually a paraphasic distortion of the proper name or some related idea.

Eye movements to the outside of the mid line were impossible. The reactions of the left pupil were interfered with by a large scar. The right pupil was dilated and its outline was

irregular. It gave no response to direct light stimulation.

The tongue, when extended, deviated to the right. The right knee jerk was more prompt than the left and there was a Babinski reflex of the right foot.

On December 9, an examination of the fundus by the Department of Ophthalmology showed in the right eye a choked disc of four diopters with hemorrhage into the retina.

There was little change in her condition from day to day. There were some days when she talked spontaneously, but usually she lay in a deep stupor.

On December 19 she had an attack in which the head was turned to the right and there was spontaneous horizontal nystagmus. The body was relaxed and there were no twitchings. About two hours later there was another somewhat lighter attack.

Generally she had no control over her bladder or bowels.

On December 17 the Department of Roentgenology reported that X-ray negatives showed "an erosive and irritating process in the left temperosphenoidal lobe, with additional erosion of the petrous portion of the temporal bone."

On December 30 she was semi-stuporous, and, seemingly from pain, she resented being disturbed. The right lid was moved more weakly than the left. At rest the right angle of the mouth was lower than the left. Both eyes moved inward but there was complete paralysis of both external recti muscles. There was no spontaneous nystagmus, but when the left eye was turned inward there were a few lateral jerks, the swifter component being towards the inner side. Both corneal reflexes were present. There were no sensory disturbances of the face. Movements of the arms were well done, excepting that the left arm was used more freely than the right. The tendon reflexes remained the same as in the former examination.

To tests with pain and touch stimuli she reacted quite well. She correctly named objects which were placed in her left hand, but the same objects when placed in her right hand were either not identified or were given the name of some object recently held in the other hand.

It had become apparent from the history and examinations that the disturbances in this patient were due to an intracranial tumor. The question of localization presented difficulties. The symptoms of right sided paresis, the paraphasic and right sided agnostic disturbances, placed the tumor in the left hemisphere. The left sided auditory nerve deafness and a weakness of the left facial nerve from a peripheral involvement suggested a disturbance in the region adjacent to the exit of these nerves at the base. The paraphasic disturbances and the information derived from the X-ray examination showed involvement of the left temporal lobe.

The bilateral involvement of the sixth nerve was difficult to explain by a tumor located only on one side. It seemed probable that this might be due to disturbances consequent upon the high degree of intracranial pressure which was present. If not, it might be that there were multiple tumors, some of which lay in the course of these nerves.

There was from the first an unusual degree of psychic disturbance in this patient. Not only was she stuporous but there were symptoms of disturbed thought and an apprehensive delirium. The rather definite localization of this tumor outside of the frontal region, involvement of which is usually found when psychic anomalies are present, suggested that these mental symptoms were dependent upon the general cerebral disturbances from the intracranial pressure.

The absence of a disturbance of the fifth nerve and the impossibility of determining any certain cerebellar involvement seemed to be sufficient for excluding a tumor of the cerebello pontine angle. At no time was there sufficient clearness as to localization to warrant surgical treatment.

The patient continued to fail and died December 31.

At the autopsy there were found a few small nodular protrusions of the skin of the chest, small tumors about the size of a small bean in the heart muscle and numerous small nodules scattered throughout both lungs. There were many small nodules scattered over the surfaces of the diaphragm. The mediastinal glands were enlarged. The mesentery and parietal peritoneum showed many small nodules. The head of the pancreas was involved in a large mass, the size of an orange. The liver contained several large nodules. The left tube and ovary were much thickened.

The examination of the brain showed the changes produced by intracranial pressure. The dura was tensely stretched. The pia was dry and velvety. The convolutions of the convexity of the brain were much flattened. The brain substance was flabby and wet. The left temporal region was extremely softened and about

2 centimeters back of the tip, a cyst with fluid contents extended to the surface.

In the superficial examination of the brain, there were observed several small nodules near the surface of the left frontal lobe, and a larger nodule in the right occipital lobe.

The brain weighed 1375 grams.

After fixation in 10 per cent. formalin, the brain was cut into longitudinal sections. In every plane the brain showed sharply circumscribed focal lesions, differing in size and appearances. The number of metastases is difficult to estimate. In one plane there were seven. One might safely state that there were at least fifty tumors scattered through the brain substance. The smallest measured a few millimeters in diameter. The largest was fully 5 centimeters across. This one occupied the tip of the left temporal lobe and had broken down into a cyst filled with a fluid content. In color, these which were not degenerated were a little darker than the gray of the cortex. Their outline were roundish or oval. They were most frequently found just beneath the gray border of the cortex.

Two other large tumors lay, one in the central white substance, between the posterior end of the left island and the ventricle, the other in the cortex and underlying white of the left second temporal convolution. Both of these larger lesions were much broken down and had numerous cavities.

The histologic study of the tumors present in both the body and brain showed them to be a richly cellular type of carcinoma. Sections from tumors of the brain presented some differences in appearances, depending upon the extent of degeneration which the tumor had undergone. In all tumor collections the characteristic cells were of an epithelial type. These were arranged in masses or strands with very little separating stroma.

In some places the pia adjacent to the tumor was densely packed with cells like those of the tumor itself. The margins of the tumor were always sharply separated from the brain substance. There was no marked reaction of the glia around the tumor, and there was no well differentiated capsule. In the vicinity of the tumor were grouped dense collections of cells, seemingly entirely cut off from the larger mass.

Around some of the bloodvessels, at a considerable distance from the tumor, were a few cells of the type of those of the tumor.

As far as the central nervous system was concerned, the process was one of multiple carcinomatous tumors, which from the other findings in the case were metastatic from tumors in the body organs.

The case and its findings are interesting in the lack of physical disturbances, which suggested such extensive carcinomatous changes as occurred in the body organs. As far as the brain condition is concerned, carcinoma is not a common type of tumor. Among some fifty-five brain tumors in our laboratory collection there are but four instances of carcinoma. In two of these the tumors were metastatic. The others were tumors growing from the epithelial structures of the choroid plexuses. Of some interest is the bilateral paralysis of the sixth nerves without any focal lesion in their course. The peculiar and prominent psychic disturbances may have their explanation in the effects produced by such widespread distribution of the tumors and the presence of several tumors in the frontal lobes.

DISCUSSION.

Dr. Carl D. Camp: Dr. Barrett said metastatic tumor of the brain is not common, and yet metastases to the nervous system, taken as a whole, must be considered sufficiently frequent to be of considerable practical importance. It so happens that in the year 1915 I saw five cases of metastases of carcinoma to the spine. One of these cases was operated outside of the Hospital. This was a case in which the metastases came from the mammary gland which had been removed five years before for carcinoma. Another of these cases was one reported by Dr. Sherrick from my clinic in the Hospital, in which the primary focus, according to Dr. Warthin, was probably in the head of the pancreas, an interesting thing in connection with Dr. Barrett's case where the primary focus was also probably in the head of the pancreas. In two other cases, in one metastasis was from the thyroid and the other from the prostate. In another case the original focus was not discovered. In this last case the patient died some time after attempted operative removal, but autopsy was not made. In all of these cases the diagnosis was confirmed either by operation or autopsy, or both.

These are not favorable cases for operation. In the case of the spinal metastases, one generally finds that the metastasis has been into the vertebrae. In the case reported by Dr. Sherrick the entire length of the spine was infiltrated with carcinoma. And even the base of the skull showed a carcinomatous infiltration.

In the case of brain and spinal metastases one finds, I think, two distinct types. The one is the multiple, discrete tumor such as is shown here by Dr. Barrett, and the other is the carcinomatous metastasis in the meninges, in which the carcinoma spreads throughout the meninges setting up a veritable carcinomatous meningitis. Of course, in either case the condition is entirely inoperable.

Dr. R. Bishop Canfield: I was interested to see this case of Dr. Barrett's because of the fact that lesions of the temporal lobe have been so difficult to diagnosticate, but have been rendered somewhat

more easy by the work of Pike and Wilson who have determined a very definite reaction to the vestibular tests in cases with lesions in the temporal lobe. They have detailed very definite reactions of the vestibular apparatus to heat and cold in such lesions. Their work has been entirely experimental and has been done chiefly on dogs. They have shown that lesions low down in the temporal lobe interfere with the normal vestibular reaction although the vestibular apparatus itself may be perfectly normal. For instance, a lesion in the lower part of the left temporal lobe is demonstrated when the ear of the corresponding side is irrigated with cold water. In such a case the normal vestibular reaction is demonstrated, while if the same ear is irrigated with hot water the slow component alone of the nystagmus is produced. This, in their opinion, has added another localizing test of considerable importance. The fact that this patient had a bilateral sixth nerve paralysis, of course, rendered this test useless. The eyes were fixed more or less in the median line and neither component when directed toward the outside could be elicited.

This case is interesting also because it casts discredit on the observation usually made of changes in the skull due to increases in pressure. I have in other cases opened the skull when the X-ray picture has demonstrated changes in the skull and have found these changes to be entirely absent. It is most interesting that in this case these changes are seen to be due to changes in the brain.

Dr. Walter R. Parker: The case is particularly interesting from an ophthalmologic standpoint for two or three reasons. I think possibly I would put first the satisfaction of postmortem demonstration of double sixth nerve paralysis. As a matter of fact, our best postmortem findings rarely demonstrate the cause of bilateral sixth nerve paralysis. As Dr. Barrett has suggested, they are probably due to pressure at the base, secondary to increased intercranial pressure.

The blindness in this case might be explained, it seems to me, from the postmortem findings in a most interesting way. As you already know blindness in cases of brain tumor does not come from the choked disc. It may come on late from the secondary optic atrophy, but one may have a swelling of the optic nerve of four or six diopters with good vision. The blindness might be produced by double homonymous hemianopsia, the lesions in the region of the calcarine fissure on the one side producing a right sided blindness and the lesions on the other side a superimposed left sided blindness.

I would like to add my testimony to that of Dr. Canfield to corroborate his disappointment in the postmortem findings in cases of areas of erosion as shown by the X-ray. They very frequently lead to disappointment.

Dr. Harry B. Schmidt: The clinical aspects of this case are very interesting to me from two standpoints. One is that the patient had a tumor at the head of the pancreas, quite large, without jaundice. This was explained by an anomaly of the common duct. An unfortunate accident in diagnosis could have been easily made had jaundice been present. The other is that with such extensive metastases there must have been some involvement of the bone marrow. Is it known whether the red cells were seen in a smear just before death?

Dr. Barrett: I think there were smears made but not just before death.

Dr. Schmidt: I should imagine that you probably would have found nucleated red cells in the blood. I never expect to see more metastases and I presume there were many metastases present which we could not see.

Dr. Barrett: I have little to add to the discussion. The other case of carcinoma which we had was metastatic from the breast. Most of the metastatic carcinomas come from the uterus, and especially from the so-called malignant deciduomata. Where you get metastases in the cord they generally involve the bone. However, in the brain you rarely get metastases in the bones of the skull, but more in the brain itself.

An interesting point in this case is the questionable character of the information gained from the X-ray examinations.

The interpretation of the plates by the Department of Roentgenology was that there was an erosion of the petrous portion of the left temporal bone. At the autopsy no change in the bones was to be made out. There was, however, a large cystic degeneration of the temporal lobe lying adjacent to this region. Whether or not such a difference from the normal condition of the brain substance would explain this, is a matter of some interest.

DEMONSTRATION OF A CASE OF GUMMA OF THE TESTIS, ASSOCIATED WITH TABES.

Udo J. Wile, M.D.
(From the Clinic of Dermatology and Syphilology, University Hospital, Ann Arbor, Michigan.)

This patient is shown for the rather remarkable coincidence of an active syphilis in association with tabes. It has long been known as a clinical fact that syphilis of the central nervous system is as a rule unassociated with active manifestation of syphilis in other systems. As a matter of fact, however, I think that the coincidence of the two, is perhaps more common than is generally appreciated. The fact that patients with tertiary syphilis and syphilis of the skin and mucous membranes in general are not subjected to routine neurologic examination would probably account for a large number of cases which remain undiscovered. It is, however, a fact, I think, that tabes and probably too, general paresis, represent exceptions to the rule of this coincidence. I don't recall off hand over four or five cases of tabes dorsalis which were associated with active syphilis demonstrable from clinical manifestations. At autopsy a number of casese of tabes unquestionably show syphilitic changes in the viscera.

The patient here is a well marked tabetic. He came into the Hospital for his tabes. In the routine examination it was noticed that he

had a very large tumescence of the left testis. The organ was firm, tense and painless and it was a matter of conjecture at first as to the nature of the tumor. From the standpoint of differential diagnosis one had to consider the possibility of a tuberculous epididymitis, of a traumatic orchitis, of a sarcoma of the testis, and lastly of a gumma. We ruled out the various diagnoses other than gumma entirely objectively. Against a tuberculosis was first of all the patient's general condition and advanced age and the absence of tuberculosis elsewhere, which of course, were merely presumptive, but objectively there was no primary epididymitis here. The testicle was enlarged as a whole, a massive, firm tumor which had none of the clinical symptoms associated with tuberculosis of the organ. The diagnosis of sarcoma had next to be considered. Against it was the lack of infiltration of the surrounding tissues, the freedom of the organ within the scrotum itself. Difference in texture I think is a very important point differentiating sarcoma from gumma. The sarcoma represents the hardest tumor with the exception of teratoma, that we have in the testis. They are of extremely rapid growth, reaching the size sometimes as large as a child's head in a short time, always associated with cachexia. Carcinomata had to be considered also. These are excessively rare in this organ and only came in for consideration very briefly. The diagnosis of gumma rests upon involvement of the organ itself, its painless character and its very characteristic rubbery feel, and the absence of any other assignable cause for the tumor.

Under treatment for general syphilis the organ has decreased in size about half, but as frequently happens in these cases, softening has occurred, and with this central softening a gumma of the skin has appeared on the surface. The organ has remained painless. It is now, however, perfectly possible to feel the outline of the organ.

The question arises as to the further therapy of this case. It is now a mass of necrotic tissue. A priori it is bad surgery to operate upon luetic processes provided one does not know ahead of time that they are luetic. The organ is functionless and represents a focus of further dissemination. It is now discharging and the organ should be removed with the full knowledge, however, that one is removing a gummous mass. With the surgical treatment the patient should be subjected very vigorously to antisyphilitic treatment.

The case is shown on account of the association of a neurologic late syphilis, tabes, with an active syphilis of the testis.

DISCUSSION.

Dr. Carl D. Camp: There is probably nothing I can add to Dr. Wile's presentation of the case further than to say that the case is an ordinary advanced tabes from a neurologic standpoint. There is one point of interest in the diagnosis which might be mentioned. It is well known that in tabes deep sensibility is diminished or lost. One of the signs of tabes is the possibility of firmly compressing the testicle, or eyeball, without producing pain. It is therefore quite possible, and I have seen it occur. to have a traumatic inflammation of the testis, or a tumor of the testis which is absolutely painless in these cases.

OBSTETRICS AND GYNECOLOGY AMONG THE ARABS.

H. G. Van Vlack, M.D.
(University of Michigan, 1910. Mason Memorial Hospital, Bahrein, Persian Gulf.)

These remarks refer chiefly to the Arabs in and about the Bahrein group of islands in the Persian Gulf but in a general way they apply to all Arabs. In fact they are true of all Mohammedan communities which are governed and guided by the Koran and the traditions of Mohammed. The slight differences are caused by the varying interpretations of the book and the traditions based upon them.

Since in a Moslem community a physician only sees the lower grades of Arab women, very little of this paper is based upon personal experience but upon data furnished me by Mrs. G. D. Van Puersen and others of the Arabian Mission to whom I am profoundly grateful.

Arab women marry very young, many when mere children. This state of affairs is due to the fact that the Arabs are so amorous and lacking in selfcontrol. The more usual age for the Arab girl to be married is from ten to fourteen years. If the girl is not married before her first menstruation, her mother sees to it that she is married as soon after as possible. Those who marry very young girls are supposed to have no sexual relations with their wives until after the first menstruation. That they often do not wait is proven by the fact that many young wives bring forth their first children before they have ever menstruated.

Since all males are forbidden to see or treat women, obstetric work naturally falls to the lot of women, which accounts for the strong position held by the Arab midwife. She is of necessity an old woman. From the samples I have seen, they are the dirtiest and ugliest of the Arab women, who are not cleanly at

their best. One of the things for which they have quite a wide reputation is the causing of abortions in the case of illegitimate or undesirable pregnancies. There is quite a flourishing trade in camphor gum here due to the fact that this is a favorite remedy for bringing on an abortion.

The lying-in room selected for the Arab woman is a dark, unused chamber without windows. The reason for the selection of such a room is that the confinement is supposed to render the room unclean, hence unusable as a prayer room and unfitted for the entrance of a man. The confinement takes place on the dirt floor, over which is spread a bit of gunny sack on top of which is placed sand to catch the blood and discharges. This is the Arab accouchement bed. The patient has on her oldest and dirtiest dress. All through the confinement they use only dirty rags and since the Arabs have still to learn the value of cleanliness, the great wonder is that the mortality is not greater than it actually is.

The preparatory treatment consists of a copious draught of a vegetable purgative tea, composed largely of senna, but which may contain any or all of the many dried herbs found in the local bazaar. A portion of the Koran is tied about each thigh as an aid in the delivery and to insure that the child will be a true believer. The Jews in this vicinity put a bit of the Taurat about the thigh or leg for the same purpose. The midwife palpates the abdomen to determine the position of the fetus. They never examine per vaginam or the mortality would certainly be much higher, since the Arab midwife has absolutely no conception of cleanliness. If it is a case in which the midwife wishes to extort an extra fee, she says that the position is abnormal. Then she proceeds to manipulate the uterus through the abdominal wall or steps on the patient's back to cause the fetus to assume the correct position. The midwives also use this back massage to hasten the labor. However, it must be said to the midwife's credit that she is often able to do a version. All manipulations are done under the covers since under no circumstances is it permissible to expose the patient.

The delivery is accomplished in the sitting posture. The patient sits on the floor during the pains, the knees drawn up, one woman holding each knee, and one at the back to press during the pains. Between the pains during all stages of labor the patient is made to walk. No instruments are used, in fact nothing is introduced into the vagina. So every patient who cannot be delivered without aid has to be taken to the "Frankee," foreign doctor, or the mother and child are allowed to die. Too often the latter course is chosen rather than go to the hated foreigner. The cord is tied with any old bit of rag that may be handy. It is cut with an old pair of scissors that have passed their day of usefulness. The cord is cut and tied about four to six inches from the body of the child as soon as the latter is born. Then a very tight bandage is tied about the abdomen of the child and it is wrapped up tightly in swaddling clothes. The mother then has a tight bandage placed about her abdomen to keep the uterus contracted. The placenta is usually delivered while the patient is standing. If the placenta is adherent or slow in being delivered, the patient lies down while the midwife stamps on the abdomen to hasten matters. Let it be remembered that all this happens on the floor and dirty sand where the blood and excretions have fallen. The placenta is delivered into the sand, no basins being used. When this is completed, the gunny sack with the sand and excrements is picked up and dumped on some refuse heap. It is seldom that they have to go far to find such a place as they are frequent and almost invariably within the town limits.

As soon as born the child is wrapped tightly in some black cloth to keep away the "Evil Eye" or devil. They generally put on a bit of green or yellow rag to keep away any infection from the eyes. If the baby's eyes become infected, (not by any means a rare thing), they use the mother's milk as an eye lotion. Better still if the cord has fallen off, it is soaked in a two ounce cup of water over night. The afflicted eye is then washed in this lotion which is said to be a sure cure.

According to the Arabs the water in which the baby is first bathed has great power. The young bride pours it over her head to insure that she will conceive. If she has been married some time without offspring, she drinks the bath water whereby her barrenness at once passes away and she becomes pregnant. Among the Arabs if the wife does not become pregnant it is the woman's fault. It never occurs to them that the man may sometimes be at fault although syphilis and gonorrhea are very common.

The treatment of the puerperium is most original and interesting. During the first twenty-four hours after confinement every Arab mother is called Mariam i. e. Mary, mother of Jesus, and her first food is dates. The reason for this is that according to Moslem tradition, Mary after her confinement found that she was

hungry. She looked up and saw only a bare date palm, as it was not the season of dates. But behold immediately as she hungered ripe dates fell from the tree. These dates are given but once and that immediately after delivery. The second day she is given a large bowl of astringent tea, made of the many kinds of herbs to be had in the bazaar. This is supposed to aid in the drying up of the secretions. The first ten days the patient is given absolutely no water to drink. Not even if she has fever is she given any fluids with the exception of one cup (2 ounces) of Arab coffee daily, which coffee is the blackest and bitterest of all coffees. Also a very little rice is given. The "Salt Treatment" commences on the first night and lasts until the tenth night if the patient is unfortunate enough to live through until that time. There is inserted into the vagina a solid piece of rock salt, which has been filed so as to fit snugly. The midwives keep an assorted stock of these on hand ready filed in various sizes and shapes. In the more difficult cases solid sticks of alum are used in place of the salt. The sufferings of the patient can only be imagined when these violent astringents are introduced into the raw and lacerated vagina.

According to the Arabs this "Salt Treatment" is necessary to prevent infections and bad odors common to the very damp climate of the Bahrein Islands. The Arabs have a great dread of odors, and believe that most diseases are due to bad odors getting into the body. If a patient has a wound he will plug both nares with bits of rags, insisting that this will keep away the odors and thus prevent an infection. But the real reason of the salt treatment is that the husband demands that all vaginal secretions be dried up as soon as possible. Then if one probes still deeper into the Arab mind the most important reason of all will be found. They insist and use this treatment so that the vagina will not be relaxed as a result of the pregnancy and delivery, and the Arab's sexual passion fail to be gratified. After forty days the husband examines the vagina by full daylight. Twilight or candle light will not do. The vagina must be absolutely dry and pale pink in color or he will divorce his wife. If the woman passes inspection the husband is willing to cohabit with her. Those who have many wives wait the forty days but the less fortunate will not wait but demand the inspection before the set time.

This "Salt Treatment" is not confined to any one of the Arab sects but is common to all Arabs about here although it is not used by the Persians or the Jews. As far as I have been able to find out it is only employed in and about the Bahrein Islands. It is reported that it is not found among the Bedouins, but I am told that it is used by some of the people in the interior, the sheiks especially employing it to increase their sexual pleasure.

As a result of this treatment the Arab women here very seldom bear but one child, while the Persians and Jews have large families. The reason for this is very apparent since atresia of the vagina is the general result of the "Salt Treatment." As the vagina becomes more and more closed, menstruation becomes more and more difficult. The pain and backaches increase every month, while the blood diminishes in amount if she menstruates at all. This process goes on until a tumor appears in the abdomen or the pain becomes unbearable and the patient seeks relief. In some cases rupture into the abdomen occurs; less often into the rectum or bladder. Death is a common ending. The midwives spoken of above sometimes operate for the relief of this condition according to the following method: They use a long hand-forged iron nail, which is forced through the scar tissue into the mass, if the thrust is lucky. Many times it goes into the bladder or into the rectum. If the patient dies "maketuub," it is written, it had to be so. If the patient gets temporary relief, the midwife takes the glory.

The Arab women of the higher social circles do not often come to men surgeons. This is especially true in all complaints peculiar to women, so the distension arising from the vaginal atresia is allowed to go on until the uterus ruptures. Ruptures into the rectum or bladder do not give relief for long. However, a goodly number of slaves and those in the lower social circles do come to us with all degrees of atresia. For convenience the following divisions may be considered:

1. Those having only the cervix closed.
2. Those having the cervix obliterated, the top of the vagina being a blank wall of cicatricial tissue.
3. Those having a part but not the whole of the vagina obliterated.
4. Those having the vagina totally obliterated up to the labia.

In our experience those of the third class are the most common, while those of the second class have proved to be the most difficult to cure by operation. The scar in these latter cases seem to be most dense and the former lines of the vagina or cervix most difficult to follow. In those of the third and fourth classes the former direction of the vagina is quite

easily followed, once the deep layers of cicatricial tissue have been passed. The cervix is usually unrecognizable. When the mass, the distended uterus, has been reached it is easily pierced and opened with a pair of dissecting scissors giving exit to old menstrual blood of a dark brown color of the consistency of apple butter. The size of the tumor depends upon the length of time the condition has existed. We have had them varying in size from that of an orange to that of a five or six months' pregnancy.

The following are two typical cases:

(1). Arab woman aged about 18 years. Has had but one pregnancy, child living. Following the delivery of the child the "Salt Treatment" was used. Since then she has menstruated but once or twice, some ten months after the delivery. Has had no symptoms of pregnancy. Since the last menstruation there have been cramping pains of increasing severity recurring at the time each menstruation should have taken place. Husband refused to allow operation or even an examination.

(2). Slave woman. One child, "Salt Treatment" used. Has menstruated four times since this pregnancy with decreasing blood and discharge while the pains have increased. Now no discharge at time of period, only pains constantly increasing in intensity. She came during one of these paroxysms, suffering intensely and ready to undergo anything to be rid of her pain.

Examination revealed a tumor the size of five months' pregnancy. Vagina was only one inch in depth, crossed at the top by many bands of cicatricial tissue. Even the walls were of scar tissue in place of the vaginal epithelium. No trace of the cervix to be found.

Operation.—Chloroform anesthesia. Retractor inserted and heavy weight attached. Vagina opened at the most superior point. Opening continued by blunt dissection with scissors until the mass was reached. During the operation the assistant pressed down on the mass. During the dissection great care had to be taken not to open the bladder or rectum. Mass opened by the points of long scissors. The usual "apple jelly" content came out in great abundance. Uterus completely emptied and irrigated with hot boric solution until the return flow came back clear. A large sterile self retaining glass douche nozzle introduced and left in place to prevent the walls of the canal closing again. Tube left in place twelve days, the patient being given a daily douche through the tube. Since the patient passed from under observation after the twentieth day, it is too early to report on the permanency of the cure in this case.

As I have been here only a year it is too early to report the results of such operations. I can only say that our methods of keeping the opening patent are unsatisfactory. To make a permanent cure there must be devised a better method for keeping the new vagina and cervix patent.

DISCUSSION.

Dr. Reuben Peterson: I may say in explanation that Dr. Van Vlack, as most of you know, is a graduate of the University of Michigan in the class of 1910. He was sent to Busrah by this University which maintains a mission there. He sent me this paper for publication and it seemed so interesting that I have taken the liberty of reading it to the Society. It is also interesting because just at this time Busrah and the region thereabout is the seat of the war. I don't know how extensively it is affecting Dr. Van Vlack and his work. Just now he is not at Busrah but at the Mason Memorial Hospital at Bahrein.

In reality the condition that follows this "salt treatment" referred to in the paper is practically what you see in congenital absence of the vagina, in atresia of the vagina. I quite agree with Dr. Van Vlack that it is a difficult condition to cure. It is not so difficult to make a temporary artificial vagina and reach either the cervix or the uterus, or to dissect up to the peritoneum where the uterus is absent, as it is to keep the vagina open so that it can functionate. We have had a number of cases in the Clinic of absence of the vagina, and I have tried various operative methods. We had one case that approximated the condition he speaks of. This was a girl where the upper part of the vagina was absent. When she was fifteen years old she had her first attempt at menstruation but no menstrual flow. When she entered the Hospital the uterus was distended to about a four or five months' pregnancy. It was extremely difficult to dissect up from below, so in that case I opened the abdomen and found the uterus and the tubes distended with the menstrual blood. Aided by the assistant's hand within the abdomen I dissected up between the bladder and rectum until I reached the distended uterus, punctured it with the scissors, as Dr. Van Vlack has described, and then kept it open until the menstrual blood had drained away. We performed a secondary operation by the flap method, taking the flaps from the labia and skin adjoining the labia and lining the artificial vagina with these flaps. The operation was not entirely successful. I kept track of the case for several years but I don't think the operation was entirely successful, although she menstruated for one or two years. The trouble was that the artificial vagina contracted until there was only a small opening.

We have had a number of other cases of absence of the vagina. In two or three of them we have dissected up between the vagina and the rectum where the uterus has been absent. In one of them I used the same flap method. This was not satisfactory, owing to the difficulty in attaching the flaps

to the upper end of the vagina, and the vagina contracted down considerably. In one case I finally decided to try using the intestine to line the artificial vagina. This case I am going to report later before this Society. Briefly, however, I will say that I used the small intestine, making a lateral anastomosis and using a loop of the intestine for the artificial vagina after dissecting up between the vagina and the rectum. The classical operation as described by Baldwin is to bring down the loops, attach them to the artificially formed vagina and after it is fixed there, to cut the septum between the loops of the bowel. The trouble was that although apparently the loop was long enough to come down it was found after the anastomosis that it was impossible to pull the loop to the vulva without putting too great tension on the bowel, so that I was forced to use only one loop of the intestine. The patient made a good recovery and the operation has been a fairly successful one. The only trouble has been that there was a stricture where the intestine passed through the peritoneum. I dilated that for some time in the Hospital. The patient subsequently married and was here about a month or six weeks ago and is fairly well satisfied with the results. Still I have felt that this is considerable of an operation to perform upon a woman who is not married. I think it is dangerous even though your anastomosis may be very carefully performed. So in a private case that I have had recently I have adopted the suggestions made by an old practitioner of this State, Dr. Charles Shepherd of Grand Rapids, who reported before the State Medical Society about twenty years ago two cases of atresia of the vagina upon which he had successfully operated. He dissected up between the vagina and the rectum and then kept the opening patent by means of a glass plug. In this case which I have under treatment now I have adopted the procedure because this girl was not married and not even engaged to be married and I didn't think I was justified in exposing her to the risk of an anastomosis. The operation was performed about six weeks ago. The vagina has been kept open by a vaginal douche plug. The cicatricial tissue is gradually creeping in and I think the result will be satisfactory. If that is so, I think it is a much better and less dangerous operation than the other.

As far as conditions are concerned, these cases of absence of the vagina, in whole or in part are quite similar to the cases reported by Dr. Van Vlack where the atresia of the vagina resulted from caustics. While it is comparatively simple to reach the uterus distended by menstrual blood, the new vagina, thus formed, will soon close unless lined with mucous membrane or skin. The latter has a tendency to contract no matter how well the flaps may be inserted. In the cases referred to in the paper there could be no objection to making use of the intestine to line the new vagina but one does hesitate to use the procedure in the case of a young woman who may never be married.

THE OCCURRENCE OF EPILEPSY IN THE MEN OF HISTORY.

HAROLD W. SHUTTER.

From the medical point of view the study of biography is difficult. It is and has been the custom of biographers so to interest themselves in the social, political and philosophic aspects of their subjects that the pathologic deviations of mind and body have been largely overlooked. Added to this is the fact that the more definite concepts of medicine, neurology and psychiatry are of a relatively recent origin.

Biographic literature still contains much of the charlatanism, superstition and ignorance of the past which, with the apparent aversion of most biographers to consider the medical aspects of their subjects, causes the chief difficulty in any individual case. One must, therefore, because of the general indefinite information as to pathology to be found in most biographies, turn, in an objective manner to the autobiography or literary production of the individual, and combine information found there with that from official records and the memoirs of his contemporaries.

Epilepsy was recognized before the time of Hippocrates. Hercules, Cambyses and so many other characters of mythology and early history are supposed to have been epileptic that it is still occasionally called the sacred sickness. Lucretius, a Roman poet, describes accurately a grandmal attack in his poem on the epileptic.

Of late, there is a growing tendency among neurologists to consider epilepsy only as a symptom and one notes the frequent use of such terms as the epilepsies or epileptoid psychoses. These expressions include the typical grandmal, petit mal and Jacksonian types, plus the host of allied conditions or equivalents, all having in common as their origin, irritation arising from or reflected from the brain. In studying such epileptics as are of interest in this paper one is not so much concerned in the attacks themselves, beyond the possibility of diagnosis, as in pre- and post-convulsive stages, the equivalent attacks and the mentality of the individual between attacks.

The pre-convulsive stage or aura manifests itself in symptoms of the motor, sensory, vasomotor or psychic varieties and may continue from a few seconds to several days. The motor phenomena are twitchings of muscles, groups of muscles or entire limbs. Frequently aphasia is present. The sensory symptoms are paraesthesias, formications, numbness, pain, peculiarities of smell or taste and visual disturbances.

Premonitory symptoms in the vasomotor system are pallor, flushes and disturbances of secretion, especially perspiration. Mentally one finds anxiety, timidity, depression and various hallucinations extending through to temporary insanity. One author, after referring to Dostoyeffsky's symptoms, has said that the most common psychic aura is a sudden acceleration of the imagination.

Usually the convulsion is followed by sleep from which the subject emerges complaining of intense headache. In not rare instances the patient passes into a trance-like state spoken of as epileptic automatism in which apparently purposeful movements are performed, the victims even going on journeys, followed later by complete amnesia. Frequently crimes are committed by these individuals and the condition is of great medicolegal interest. Acute mania and transitory delusional states are also found after attacks.

Equivalent attacks are classed by Turner, as follows:

First, psychical attacks consisting of automatic actions, changes of expression, tremors and amnesia; second, mania and impulsions, frequently associated with suicide and homicide; third, dream states; fourth, transitory delusions; fifth, catatonic stupor; and sixth, such symptoms as headaches, pseudo-angina, nausea, vomiting and the like.

Several traits or peculiarities of temperament appear to be common to most epileptics. Egotism, obstinacy, mobility of character and sentimental religious fervor are noted. They are frequently irritable, morose, suspicious and given to great variations of mood. Hypochondria is common. The ability to judge right from wrong seems frequently impaired and they are often subject to dangerous impulsiveness, indecision, apprehensiveness and fears.

It has been convenient to group the individuals here considered under the following heads: political and military leaders, religious leaders, and the broad class of philosophers, artists, novelists, poets, dramatists, actors and the like. It is found that in each of the three main classes, certain traits of the epileptic temperament predominate in guiding the direction of activities, while others, although present and prominent, are more latent as regards the course of action. This is well brought out in the political and military leaders where one is surprised to learn the identity of several who at one time or another exhibited convulsions or epileptic equivalents.

Plutarch's Lives contain several interesting statements concerning the falling sickness of Julius Caesar. The material for Shakespeare's play of that name came from North's translation of Plutarch, particularly the lives of Brutus, Cassius and Caesar, and from literary, interest one may well consider the tragedy with the biography. Much is made in the play of the convulsive attacks and the changing mentality of Caesar, all of which has its foundation in Plutarch. In the first act you will recall the attack in Spain and a second while swimming in the Tiber, also Casca's description of the refusal of the crown, at the end of which he says: "He fell down at the market place and foamed at the mouth and was speechless," to which Brutus replies: "'Tis very like he hath the falling sickness." In North's translation one finds the following description of Caesar. "For concerning the constitution of his body, he was leane, white and soft skinned, often subject to headache and otherwhile to the falling sickness: (the which tooke him the first time in Corduba, a citie of Spayne). He yielded not to the disease of his body, to make it a cloke to cherishe him withall, but contrarille tooke the pains of warre as a medicine to cure his sick bodie, fighting always with his disease," etc. One also finds reference to Caesar's attack before the battle of Thapsus, he at that time being carried to the rear where he lay on a cot until the symptoms subsided. Suetonius, a Roman historian, is also authority as to Caesar's condition and mentions two attacks while transacting business. Dr. Gervinus, a German, in his "Commentaries of Shakespeare" calls especial attention to the changes in Caesar's mentality as brought out in the play, and having their basis in the statements of Plutarch. He notes how Caesar became superstitious, suspicious and apprehensive. Where his former boldness had carried projects to completion his present indecision and doubt cause their failure. Moulton in his Shakespeare as a dramatic artist says. "Assassination is a less piteous thing than to see the giant intellect, by its very strength unable to contend against the low cunning of a fifth rate intriguer." If one takes this statement, remembering that suspicion, superstition, apprehensiveness and indecision are frequent symptoms of epileptic dementia, one has, I think, an excellent key to the tragedy. (3, 10, 11.)

The Claudian Julian family which followed Caesar is of interest chiefly as a study of heredity and degeneracy. Caligula, Germanicus and Britannicus were epileptics and Nero

is said to have had the epileptic tendency. (See Ireland "Blot on the Brain.") (5, 16.)

Another family which challenges the attention is that of Peter-the-Great. Ireland says that it was probably through the custom of selecting the queen from the most beautiful of the peasant girls that degeneracy came into the family. Feodor, a half brother of Peter was weak minded, Ivan imbecilic and epileptic. Sophia, an own sister, was extremely cruel, and Peter, says Moreau, suffered from nervous attacks which later degenerated into epilepsy. In the Memoirs of St. Simon one finds the following description of the great Russion: "If he gave thought thereto, his mien was majestic and gracious, else was it forbidding and almost savage, his eyes and face were occasionally distorted by a tic which rendered his expression wild and terrible." Peter, who has been called a singular medley of self sacrifice and tyranny, humanity and cruelty, in temperament falls well into a class whose egotistic obsessions have force and ability enough behind to give them power. Of his six sons, five died in childhood, the sixth was put to death by his father. (1, 5, 6.)

Mignet is the authority for the statement that Charles V. was epileptic. The Emperor was easily the most powerful ruler of Europe in his time, and while perpetually absorbed with wars and great enterprises was tried both by good and bad fortune. In some things he was mean and unscrupulous, was subject to fits of melancholy and deeply religious. Mignet after describing the deformity of his jaw and his difficulty of speech states that he is known to have had several fits of epilepsy which later in life took the form of severe headaches. One of his grandsons was epileptic. (2, 12.)

Marlborough from boyhood was subject to periodic attacks of headache and giddiness which affected him (according to his correspondence) particularly about the time of the battle of Blenheim. At 66 he returned to England, where he suffered convulsive attacks. Coxe in his biography, notwithstanding the statements of the Duchess, believes the Duke to have been affected mentally. Nisbet declares that epilepsy reduced the vigor of both his mind and body. A summary of Marlborough's condition is left by his wife in a legal paper written to forestall any effort to invalidate the Duke's will. She mentions the first attack, the recurrences, and his mental condition between attacks. Coxe says: "The Duchess has been criticized for leading her infirm and suffering husband into public view, and exposing to the multitude so pitiful a spectacle of human imbecility." One daughter died "long afflicted with a tedious disorder which she bore with consummate fortitude and piety." Her extremely religious nature is noted. (2, 13.)

The possibility of epilepsy in Napoleon, after one hundred years of controversy, still continues to raise discusssion. Constant in his Memoirs mentions the exhibition of a tic consisting of frequent and rapid elevation of the right shoulder, which those who did not know him sometimes interpreted as a sign of dissatisfaction and disapproval, seeking uneasily wherein they could have failed to please him. Bourrienne, Napoleon's private secretary for sixteen years, declared he never saw symptoms of a general attack. He mentions the tic as extending also to the mouth and lips. One of his feminine admirers describes him as irritable, morose and splenetic from boyhood, domineering, with a disposition alternately sullen and impulsive, and lacking in all consideration for the feelings of others. He had a frightful anger and a winning smile. Nisbet, using Mineval as an authority, mentions the significance of reports of convulsions and the possible relation of the Emperor's greatness to the epileptic habit. Corvisart, Napoleon's physician says Madame de Rémusat described the Emperor's awakening from sleep as "generally melancholy and apparently painful, and that not infrequently he had convulsive spasms in the stomach which made him vomit." The latter condition may have been associated with his gastric disorder, he later dying of carcinoma. Laine, in the Revue de Deux Mondes, considers the Emperor to have been a psychic epileptic with gigantic megalomaniacal illusions, impulsiveness and complete absence of moral sense.

Radestock describes a definite hallucination during the Russian campaign. Oppenheim, Radecliff and Clark all mention Napoleon as epileptic. (2, 6, 8, 14, 15, 16, 17.)

Greville's Memoirs of the Reign of Queen Victoria contain several references to the convulsive attacks and failing mentality which came over the Duke of Wellington in the last twelve years of his life. Many times he caused diplomatic circles great concern because of his unwillingness to resign himself to private life. Lyndhurst once said he hoped His Lordship would retire before he became a dotard like Marlborough or a driveler like Swift. Greville, once lamenting the Duke's condition said: "It becomes impossible not to regret that in his seventy-third year and after three epileptic fits he was not permitted to hold himself free from

the trammels of executive government." Wellington's temperament became markedly changed. Irritability, unreasonableness and fits of anger eventually gave way to delusions. On February 9, 1841, Greville says. "The Duke had an attack the other night in the House of Lords and was taken home speechless, but not senseless. It was severe but short and after the stomach was relieved he rapidly recovered." The London Times for September 16, 1862, contains the following article: "Of late years increasing infirmities manifest, though energetically resisted—the treacherous ear (he became deaf) the struggling utterance, and the tottering step—all told their tale, and suggested that the greatest man of his age might live to illustrate the decay from which no genius is secure." (2, 39).

In summarizing the prominent characteristics in the temperament of all these men, one is impressed with their resolute, self confident attitude toward surroundings. Extreme egotism, impulsiveness and a relentless nature are common to most of them. To a large extent religiosity and superstition are not marked. Utter disregard of morals is found in the inner lives of a number.

The two most illustrious religious celebrities who have been christened epileptic by tradition are Mohamet and St. Paul. In an interesting article written by Howden in 1872 he says: "Irritability, suspicion, impulsive violence, egotism and strong homicidal propensities are the most commonly observed characteristics of the insane epileptic; but in strange contradistinction with these we frequently find combined a strong devotional feeling, manifesting itself, may be, in simple piety or in decided religious delusions." Renan in his book on the apostles says of Paul: "His health was always poor because of a strange infirmity which he calls a 'thorn in the flesh,' and which was probably a serious neurosis. His moral character was anomalous; naturally kind and courteous, he became ferocious when excited by passion. As an enthusiastic leader of the Pharisees he was among the fiercest persecutors." With permission of the high priest he set out for Damascus to arrest the leader of a band of Christians quartered there. On nearing his destination he suddenly fell to the ground, unconscious. An hallucination followed in which Christ appeared to him. For three days he neither ate nor drank, meanwhile suffering from fever, the latter a term used indiscriminately in the Bible to indicate sickness. During Paul's convalescence he experienced hallucinations from which he emerged converted. Renan in his Life of Paul considers his gospel to be illogical in several places. It was, however, the bold spirit of that disciple which pushed Christianity out to sea, probably saving it from the fate of myriads of other religious cults. Lombroso, William James and Clark of N. Y. mention Paul as an epileptic. (4, 8, 17, 18, 19, 20.)

Beyond a doubt the divine inspiration which prompted Mohamet in founding the religion which bears his name came from his own morbid brain. Probably the best authority on his malady is Sprenger, who has collected most of the available evidence. Muir of London mentions a tradition describing Mohamet's visitations. "Sometimes Gabriel cometh and communicateth the revelations unto me, as one man unto another, and this is easy; at other times it afflicteth me like the ringing of a bell, penetrating my very heart and rendering me, as it were, in pieces, and this it is which grieviously afflicteth me." Apparently here one may interpret painful attacks possibly epileptic in origin. Ayescha, his favorite wife, observed the prophet during revelation on a cold day, and when it was over noticed drops of sweat on his forehead. Othman, watching the prophet during a visitation of the angel, marked how his eyes turned first toward Heaven, to the right, and later toward the left and down. The attack was followed by sweating, also by a new verse of the Koran. Other traditions are; that he was found red and unconscious, that associated with his attacks he made strange sounds like the crying of a young camel, significant as the preconvulsive cry. The prophet is known to have been cupped, a treatment used often in mental disorders. Ireland says that the silence of the Mohammedan commentators to assertions by the Greeks of epilepsy in their leader, is some of the most conclusive evidence of his malady. Whether Mohamet was epileptic (most authorities believe he was) or hysterical, one is hardly justified in denying the sincerity of his own belief. (2, 4, 5, 21, 22.)

Lombroso asserts that Dante had epileptic fits, basing his statements on incidents in the "Divina Commedia" in one of which Dante says he fell headlong and lost consciousness.

"He ceased, the gloomy region shook amain,
Still its mere memory bathes with sweat my brow,
Rumbled that land of tears with moaning wind:
A light, vermillion coloured, flashed from Hell;
And wholly vanquished my palsied mind.
Even as a man whom sleep o'ertakes, I fell."

Beyond the statement of Lombroso, considered unwarranted by Hirsch, I have found no authority to consider Dante epileptic. (4, 7.)

History is full of strange religious cults which have arisen endemically throughout all time. Almost invariably these bands have at their head some mental deviate. Frequently epileptic dementia has been demonstrated as the source of their inspiration. Anne Lee, founder of the Shakers was such a character, says Clark, who is also authority for the statement that Joseph Smith suffered from epilepsy. (See article in *Boston Medical and Surgical Journal,* Jan., 1915.) (2, 17,)

The chief things of note about the religious epileptic are the highly developed imagination, the power of leadership and the egotism so marked in their religious sentiment. These men defend their assertions boldly and resemble the military leaders in the manner used to establish their faith. Mohamet by oratory and force was but a few years in winning a large part of Arabia.

Hallucinations and delusions probably reach an extreme in the religious fanatic. Clark, in the article previously mentioned, shows the high degree of development of the imagination in the epileptic, and says: "In time it will probably seem less strange that much of our religious conception of Heaven, which has been fashioned by epileptics out of their unconscious conception of the mother life, should be so satisfactory to the entire human family."

Turning to the third main class here considered: Swedenborg seems to have been peculiar from birth. As a child he had peculiar psychic alterations. Maudsley in the *Journal of Mental Science* for 1869 considers thoroughly the mental condition of the philosopher. He mentions the early manifestations as a child and the probability of their becoming typically epileptic. At one stage in his life he had an attack of acute mania. At 56, Brockner, his landlord in London, found him foaming at the mouth and declaring he was the Messiah in person. He is said to have removed his clothing in the street and rolled in the gutter (an inclination to such exposure is common in epileptic dementia). Nisbet says the outbreak mentioned occurred with an epileptic seizure, and from this period onward Swedenborg's delusions were all of an insane character. The main points in his own description of an attack are: a clamor under the head, rigor, a din in the ears, sleep; shivered later as if the winds rushed together and shook him, communed with Christ, and on coming out wet with sweat, he said he had been holding communion with the Lord. In his work he demonstrates how his mind struggled to maintain the reality of his delusions. Maudsley, Nisbet and Ireland consider Swedenborg's condition to have been epileptoid in origin. (2, 5, 23.)

Of Balzac, Nisbet says: "At school Balzac had an epileptic seizure which so alarmed his teachers that they urged his parents to take him home." Of singular import, however, is the fact that similar symptoms are never known to have recurred. Balzac had many of the peculiarities attributed to men of genius. His work, however, was accomplished by an almost brutal mental and physical effort, he working always from twelve to eighteen hours a day. Balzac once wrote to M. Hanska (Sanders' "Balzac") that if his misfortunes did not kill him, he feared they would destroy his reason. Gould in his "Biographical Clinics" throws light on the so-called alarming attack at school by showing that the boy of fourteen had not had a vacation in seven years, had completed "Treatises on the Will," and, unknown to the professors, had read a greater part of the rich library of the college. Knowing this, Gould scoffs at the idea of blaming "pathology" or "heredity" for the boy's break down. (2, 24, 25.)

The grandfather of Alexander Dumas married a full blooded negress at San Domingo. The son of Gen. Dumas shortly before death married a young woman, the mother of Alexander. "The alliance," says Nisbet, "was physiologically unsound, for Madame Dumas was subject to epileptic fits—she had one which attracted public attention at the performance of her son's first play." The author himself never exhibited epileptic symptoms. (1, 2.)

Dostoyeffsky, one of the great trio in the Russian literature of the last century, was undeniably epileptic; and his own disease as interpreted and incorporated in his works makes up a considerable portion of their content. Clark has considered every phase of the great author's malady in an article found in the *Boston Medical and Surgical Journal* for January, 1915. Dostoyeffsky had numerous attacks; several times they occurred at the homes of friends who have since described them. The preconvulsive aurae from his own statements were elaborate and somewhat erotic in type. and, much of the writer's inspiration was received in the moments preceding his convulsive seizures. His first attack came during exile and was followed by a series extending over many years. Dostoyeffsky's mother is described as exalted and epileptic. Clark says, "All the out-

croppings of Dostoyeffsky's egotistic and infantile feelings and ideas in the minor and beginnings of the major attacks, are over and over again elaborated in his novels." It may be added that for the most part the chief characters of his novels are epileptics. (4, 17.)

A very interesting case is that of Byron. "On the evening of February 15, 1824," says Jeaffreson in his book, The Real Lord Byron, "while sitting in Colonel Stanhope's room he had his first epileptic seizure in the presence of several witnesses to the effort he made to regain his self command. The attack was sharp, but short, and he seems to have come fairly out of it in twenty minutes. The poet had five fits in three days, and two months later he passed away." The immediate cause of his death was said to be 'a fever arising from a chill.' Probably the end was hastened by the excessive bleeding to which the patient was subjected, the doctors fearing that the epileptic attacks would be followed, as they so often are, by mental derangement. Byron came of weakened stock on both paternal and maternal sides, and the irresponsible, insincere nature of the poet is known to all. "His diary," and one may add, actions, "reflect a destempered mind," says Nisbet. It would be of interest to know whether the convulsion alone or the convulsion and its resulting lethargic state extended over twenty minutes. White says one should always suspect attacks of such long duration, appearing for the first time in men of this age as being due to paresis. (2, 26.)

Gustav Flaubert the French author, is an undoubted case of epilepsy. Gould has well summarized his case in his Biographical Clinics, where he says that contrary to the general belief, Flaubert's attacks began early in life. His first definite attack after reaching manhood occurred in Paris and was noctural in appearance. One of the peculiarities of Flaubert's malady was the aura in which he experienced a peculiar yellow flame, first before one, then the other eye. This he called his "golden vision." Du Camp cites his friend as a great genius lost to the world because of epilepsy. After enduring the attacks several years Flaubert's memory began to weaken and his nature changed greatly. He became morose, hypochondriacal and sensitive, for the most part avoiding the public. (2, 25.)

Tom Sheridan, famous for his "School for Scandal" and the "Rivals" came from a family given to insanity and ne'er do wells, and is said to have become epileptic in the last few years of his life. Nisbet says, "At the age of 66 he was seized with epileptic attacks." In a letter written to his son (found in several biographies) a short time before death he mentioned trouble with varicose veins and 'his secret alarming complaint.' Starnforth in his life of Sheridan says, "After a succession of shivering fits, he fell into a state of exhaustion, in which he continued with but few more signs of suffering till his death. His nature was one of careless disregard for all about. He was thriftless, extravagant and lived with considerable indifference to the usual moral check." (2, 27.)

"Handel," says Lombroso, "was subject to furious and epileptic rage." Late in life after a stroke of apoplexy he became for a time demented. As a teacher he frequently lost all control of his temper and once is reported to have held a prima donna out of the window threatening to drop her unless she sang a passage in a certain way. I can find no mention of convulsions in several biographies. (2, 4, 6.)

Mendelssohn came from a highly neuropathic family. Rockstrov in his life of the composer informs us that he weakened rapidly in the last few years of his life, and during the rehearsal of Elijah, his last great work, had many attacks of epilepsy. Henschel in his "Die Familie Mendelssohn" gives a description of an attack at the home of a friend, Mme. Frege. She "found him shivering, with his hands cold and stiff and his head aching violently." He was taken home where the attacks recurred with increasing violence until he died one month later. (2, 4, 28, 29, 30.)

Mozart's mother is reported to have died of a nervous disease associated with convulsions, delirium and prolonged insensibility. (Nisbet). The composer himself died young in a demented condition. During the composition of the Requiem he labored under the delusion that he was being poisoned, frequently swooned away and became practically paralyzed. (1, 2.)

Taschereau says of Molière, the great French playwright, "At the time of his early appearance Molière was held, even in the provinces, to be a comedian of very inferior order, owing perhaps to a hiccough or throat tic leaving a disagreeable impression of his acting on those not aware of its existence." Radestock and Nisbet on the authority of Grimavest consider him to have been epileptic; and the former mentions his losing time from his work because of convulsions and nervous attacks.

Rachael the great tragic actress was the daughter of a Jewish rag peddler named Fèlix. She was throughout life of an hysterical nature,

and was subject to fits. (Nisbet.) Describing her attacks she said: "Sometimes I fancy that night is suddenly falling and I feel, as it were, a great void in my head and in my mind. Of a sudden all the light goes out and your poor Rachael quite ceases to exist." Tuberculosis was the cause of her death at 37. (1, 2, 31.)

Paganini the Italian violinist of the early last century suffered from childhood with convulsive seizures. Catatonic attacks are said to have kept him in a stupor for hours at a time. Radestock says that the exhaustion which overtook Paganini after a difficult program was similar to that following an epileptic convulsion, and one may add, was probably hysterical in origin. (1, 2, 4.)

Epilepsy, convulsions and epileptic equivalents have been attributed to many others among the greater men of history, but in many cases one is able to prove the nature of the attack to be other than epileptiod in origin, or else sufficient evidence cannot be found to warrant the assumption of epilepsy. The convulsive attacks attributed to Dickens, if one is to believe his friend Forster, were very painful and resembled ordinary cramps. Apparently localized on one side, the absence of other symptoms of epilepsy would lead one to suspect a local lesion of that region. Gould is probably correct in attributing Dean Swift's symptoms to a lifelong ametropic condition of the eyes. Gould also discredits any statements as to Swift's trouble having originated in the labyrinth of the ear. (Gould's Biographical Clinics.) (2, 25, 32.)

Lombroso says Newton suffered from a form of vertigo related to epilepsy. Radestock mentions the severity of his condition which was followed late in life by dementia.

Bevenuto Cellini the Italian artist has been called epileptic. Undoubtedly he did suffer from hallucinations of sight, but the most interesting pathology of his autobiography is his description of the French disease which he acquired from the "fine young servant girl," whom he had in his employ. No mention of convulsions was found. (2, 33.)

Thackeray, says Antony Trollope in his life of the author, was subject during the last thirteen years of his life to painful spasms which were probably the immediate cause of his death. Beyond this I can find no description of the attacks. (2, 34.)

Dr. Johnson was throughout his life hypochondriacal and haunted with the dread of insanity. One eye was useless and he suffered from hallucinations of hearing. Because of his disorder he was fretful, impatient, and irritable, but in consideration of his conditions, Boswell says we should not wonder at his peculiarities. Nisbet attributes convulsive spasms to Johnson. (2, 4, 35.)

'Schiller, sickly as a youth, had several nervous fevers, often going into convulsions or fits." This is a translation from Radestock based on the authority of Emil Palleske. Alfieri, the Italian poet, late in life went into convulsions, says Radestock, referring to the autobiography of the latter. In the English translation of the autobiography, the convulsive attacks must be the severe seizures of gout there mentioned. (4, 6.)

Henry K. White an English poet is considered by Nisbet to have been epileptic. Sir Harris Nicolas in mentioning White's fear of tuberculosis says: "He was not aware that he was generating or fostering in himself another disease little less dreadful and which threatens the intellect as well as life." In another point his biographer says: "He found himself, on his first seizure, too ill to receive his brother." No description of the convulsion was found, White died early of phthisis. (2, 36.)

Blaise Pascal, who discovered the barometric principle, suffered late in life, says Moreau, from convulsions which lasted twenty-four hours at a time. M. Lélut considers his nervous constitution very delicate, he being subject to hypochondria and hysteria. At one time he was paralyzed from the waist down, the paralysis being inorganic in origin. (2, 4, 37.)

One notices on close study of the individuals considered, particularly those suffering from their malady for a period of many years, or suffering acutely for a short time, the tendency for what is probably the same etiologic factor, to manifest itself in disturbances of sanity, as well as to produce the peripheral symptoms of epilepsy.

It must be apparent that from traditional evidence one is unable to say in many of these cases, whether the patient really suffered from epilepsy and its equivalents or whether the symptoms were due to other causes. One questions also in the cases showing convulsions late in life whether or not one should consider them epileptic. Terminal epilepsy is, however, a recognized form of the malady.

In regard to temperament, in the group of philosophers, novelists, and poets one finds a greater variation than in the other two large classes. Independence, highly developed imagination, tendency to hypochondria, egotism and

moral indifference are perhaps the most frequent traits noted.

The question is often asked, Do the etiologic factors in epilepsy have a function in the production of genius? Lombroso, an extremist, believed genius to be epileptoid in origin, and has a large following. Nisbet says: "Occasionally there is a great intellectual activity produced by the epileptic condition, which seems to be caused by a wave of morbid excitement passing over the different cerebral centers." (See Insanity of Genius). Others, as Hirsch, would in no way consider the possibility of a psychosis or psychoneurosis being a factor in the production of genius or creative ability.

The study of the men considered has been of interest both from the scientific and the literary point of view. One is able to fully appreciate the productions of an author, poet or artist only on gaining a fair knowledge of the individual himself, after which the influence of mental pathology on his production will be apparent. Unfortunately one cannot consider fully any individual case in an article of this length. The purpose here has been simply to collect some of the facts in the cases of the more prominent men who have at various times been considered epileptic.

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DISCUSSION.

Dr. Albert M. Barrett: I have been much interested in Mr. Shutter's paper. It is an illustration of the possibilities open to medical students for doing work somewhat broader than that required in their routine. Casual references to the occurrence of epilepsy in men of historic importance are met with in most treatises dealing with the subject of epilepsy. Mr. Shutter is to be commended for the large list of such characters which he has been able to get together in this paper.

One cannot help but feel that there must be some uncertainty as to the genuineness of the epilepsy ascribed to many of these individuals. The differentiation of attacks resembling those of epilepsy is not easy. Many of these conditions suggest possibilities of hysterical attacks, or, especially in the old, those due to vascular disorders. The significance of these latter conditions, as bearing upon mental development and peculiarities, is quite different from that of an idiopathic epilepsy.

Dr. Carl D. Camp: I have been very much interested in Mr. Shutter's paper. It makes a point which I have often tried to emphasize that with the possible exception of hysteria, there is certainly no disease to which mankind is exposed, which has as much bearing on social life and conditions as epilepsy. Personally I am inclined to believe with Lombroso, that there is a definite relation between epilepsy and genius. One realizes that these men that have been mentioned are not men of great talent. They are abnormal men. I have not studied very deeply into the epilepsies of most of the men mentioned, but I have been interested in the epileptic characteristics of the various Russian writers. In these men one finds internal evidence in their writings that they are epileptic. They have described their feelings and attacks so that one can readily recognize that they knew what they were talking about from personal experience.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, February 3, 1916

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

THE ASEPTIC TECHNIC METHOD IN THE MANAGEMENT OF A CONTAGIOUS HOSPITAL.

REPORT OF THE CONTAGIOUS DEPARTMENT, UNIVERSITY HOSPITAL, FOR THE YEAR 1914-1915.

DAVID MURRAY COWIE, M.D.

(From the Clinic of Pediatrics and Contagious Diseases, University Hospital, Ann Arbor, Michigan).

During the year ending June 30, 1915, two hundred and twenty-three cases were cared for in the contagious division of the Pediatric Service of the University Hospital. The new Contagious Hospital received its first patient August 9, 1914. The following diseases were treated:

TABLE I.

List of Cases Entering Contagious Hospital from August 9th, 1914 to July 1st, 1915.

	Cases	Recoveries	Deaths
Chicken-pox	29	29	0
Diphtheria	49	49	0
Diphtheria Carriers	3	3	0
Erysipelas	4	4	0
Erysipelatous Cellulitis	1	0	1
German Measles	1	1	0
Impetigo Contagiosa	3	1	2
Mumps	29	29	0
Pemphygus	1	1	0
Scarlet Fever	26	26	0
Septicemia	2	0	2
Small-pox	3	3	0
Tonsillitis, acute follicular	27	27	0
Whooping-cough	1	1	0
Pharyngitis, acute	2	2	0
Observation cases*	42	42	0
Total Cases	223	218	5
Mortality	2.24%		

*Included in Observation Cases are:

Anomalous rashes and eruptions	6
Directly exposed cases	27
Miscellaneous cases	9
	42

These cases came from the following locations: (See Table II)

The number and variety of cases by months is recorded in Table III.

The policy of the hospital during the year has been to put into operation, as an investigation, the aseptic technic method. This method, as you well know, ignores, within three feet of the bed, the air borne theory of the spread of contagious diseases, and supports the idea that the very great majority of contagious and infectious diseases are communicated from one individual to another, or from one place to another, by means of direct or indirect contact. In other words, the infected person has come either in direct contact with the patient or with something that has, directly or indirectly, touched him.

If this idea can be proved to be correct or adequate, at once a great economic factor has been introduced into contagious hospital work. It permits of ward nursing, that is, as in a medical ward, a nurse passes from a diabetes case to a nephritis case without contracting the disease herself or conveying it to another, so, in a contagious ward, a nurse or a physician may pass from a scarlet fever patient to a measles or a diphtheria patient without contracting the disease himself or conveying it to another. In other words it means that the time of a nurse, which cannot be fully occupied by the needs of a single patient, may be utilized to care for several others. It further means that the combined efforts of several nurses, who may safely come together without fear of contaminating each other, produce greater efficiency and accordingly, I believe, a better managed hospital than could possibly be attained by the older method at a greater cost.

Our first experiment was carried out in the Palmer Ward, while the new hospital was in

process of construction. In conducting this work, we take into careful account the fact that certain contagious diseases, chicken pox and measles for example, are harder to control than others. Their contagium, while less viable, for some reason is either more easily received bv individuals or is more proliferative. A case of chicken pox broke out soon after the patient entered the ward. One of the isolation rooms in the ward had been arranged for carrying out the aseptic technic. The case was recognized very early, and few, if any, were exposed. Accordingly quite a favorable opportunity presented itself for our investigation. The nurse in charge of the ward, Miss Ware, had gone over the details of the aseptic technic previously with me, and very intelligently coöperated in conducting this simple, but, as will be seen later, successful experiment. The patient had a well marked case of chicken pox. The nurses assigned to his care, observing the technic, the details of which I will not detain you with at this time,[1] attended to the patient's needs and passed from the isolation room to attend to their several duties on the ward. In other words, this case was treated, with the exception of the aseptic precautions, as a ward case on the same floor with thirty to thirty-two other children. No quarantine was placed on the ward. The

TABLE II.

August 8th, 1914 to July 1st, 1915.
Conditions for which they entered.

Patients entered the Contagious Hospital from the following localities.		Chicken-pox	Diphtheria	Diphtheria Carrier	Erysipelas	Erysipelas Cellulitis	German Measles	Impetigo Contagiosa	Mumps	Scarlet Fever	Septicemia	Small-pox	Pemphygus	Tonsillitis, acute follicular	Whooping-cough	Observation	Pharyngitis, acute
Chelsea	1		1														
City	37	3	7		1				1	9	1	2		4		9	
Health Service	62	4	12		2		1		25	1		1		10		6	
Homeopathic Hospital	1	1															
Hospital Waiting Room	3														1	2	
Maternity Ward	2													1		1	
Medical Ward	14																
Internal Medicine... 3			1							1						1	
Dermatology 10		1	2											1		6	
Neurology 1			1														
Eye and Ear Wards	14																
Ophthalmology 3			2											1			
Otolaryngology 11			4	1	1	1			2		1			1			
Psychopathic Ward	1	1															
Surgical Ward	9																
Men's Surgical 9			5							1				1		2	
Women's Surgical .. 0																	
Palmer Ward	68																
First Floor 17			9	2										2		3	1
Second Floor 51		16	4					3		12			1	2		12	1
Nurses Home	2								1					1			
Contagious Hospital	9																
Nurses 3														3			
Cross Infection 5		2	2							1							
Intern 1										1							
Total Cases	223	28	50	3	4	1	1	3	29	26	2	3	1	27	1	42	2

1. The reader is referred to Prof. Peterson's article on The New Contagious Hospital, Journal of the Michigan State Medical Society, May 1914.

case ran a normal course, and no case of cross infection of chicken pox developed in the ward. Had this been a case of scarlet fever or of diphtheria such a result would have meant nothing, for we are all quite familiar with the fact that many individuals may be exposed to each of these diseases without becoming infected.

Several weeks prior to this experiment no one would have condemned it, on general grounds, more than myself, but during this time, I had gone to Providence to investigate the system as practiced there. At that institution I was accorded all the privileges of the hospital, and shown many courtesies by its medical superintendent, Dr. D. L. Richardson. I lived in the hospital until I was sure I understood the technic, and until my previous opposition was overcome by the evidence which daily confronted me. We are indebted to our medical director, Dr. Peterson, for his tactful insistence that this method be given a trial. He had been to Providence and had seen, he returned and conquered our prejudices. Two objections to the method, which I stated at that time, I still cling to, and these are the

TABLE III.

Contagious Hospital Report by Months.

	Chicken-pox	Diphtheria	Diphtheria Carrier	Erysipelas	Erysipelas Cellulitis	German Measles	Impetigo Contagiosa	Mumps	Pemphygus	Pharyngitis	Scarlet Fever	Septicemia	Small-pox	Tonsillitis, acute follicular	Whooping-cough	Observation	Total	Cross Infections Occurred
August		1		1	1						1	1		1		1	7	
September		3												1		3	7	
October		1	2							1	2			2		2	10	
November	4	7				1		2		1	4		1	4		2	26	2
December	3	8						1			1		1	4			18	3
January	2	3						5			1		1	4		7	23	
February	4	1						9	1		4			2		12	33	
March	8	5						7			11					5	36	
April	6	11	1				3	3			2			3		5	34	
May	1			1				2				1		3		1	9	
June	1	9		2										3	1	4	20	
Total of	29	49	3	4	1	1	3	29	1	2	26	2	3	27	1	42	223	5
Fatality	0	0	0	0	1	0	2		0	0	0	2	0	0	0	0		0

Total number of cases including secondary diseases 223

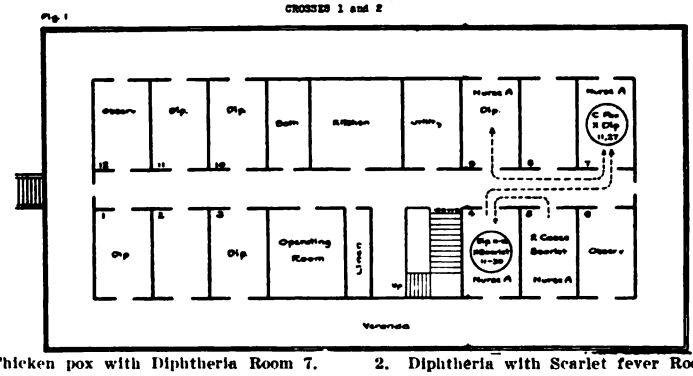
Total number of admissions 215

Total number of secondary diseases* 8

*By secondary diseases are meant diseases developing in the hospital after admission, contracted either within or without the hospital. They are as follows:

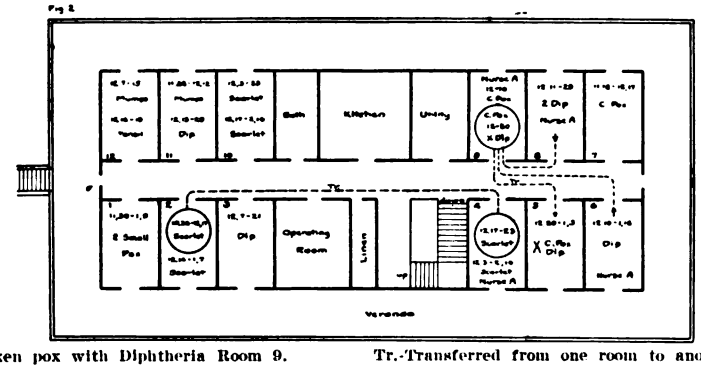
Diseases	Contracted in hospital	Contracted outside of hospital
Chickenpox	2	1
Scarlet Fever	1	1
Diphtheria	2	1

only ones which give me any concern in the conduct of the hospital to which I am fortunate enough to be assigned. They are: I, The danger of incubating cases among the nurses and attendants. II, The danger of diphtheria carriers among the nurses and attendants. For example, a nurse or a doctor or a medical student may not have had the disease, upon the case of which he daily attends, he may become infected, and he may not know when, hence



1. Chicken pox with Diphtheria Room 7. 2. Diphtheria with Scarlet fever Room 4.

his incubation period cannot be watched as it would if he had accidentally and knowingly infected himself. For example, let us suppose that he knowingly infected himself with chicken pox, under this condition he would not be of danger to others for many days (let us say 12 days) after which time he could remove himself from contact with others until the entire incubation period (16 to 17 days), is over. In the case of diphtheria, it is a well known fact that a person may harbor the diphtheria bacil-



Chicken pox with Diphtheria Room 9. Tr.-Transferred from one room to another.

lus in his nose or throat and not develop the disease himself. He may, nevertheless, transmit it to those who are susceptible. Frequent cultures of the nose and throat of those exposed to diphtheria may show negative results for many days, when at last a positive culture is obtained. The mere fact that the culture is positive compels us to admit that damage may have already been done. I believe these obstacles, however, are not insurmountable. Certainly our experience, and particularly that of the Providence City Hospital, tends to minimize in our minds the probable danger from either of these sources. The whole question depends upon efficient technic and conscientiousness.

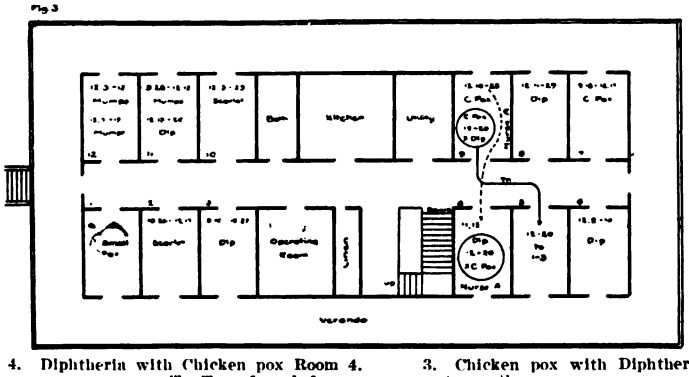
Let us now take up the several factors entering into our investigation: First, the danger to those who come to the hospital to learn (medical students, visiting physicians and nurses), and those who come to the hospital to serve (physicians, nurses and attendants); Second, the danger of patients.

First: Nurses, doctors and students enter the contagious hospital with this thought impressed upon them, "If you get any of these diseases it is your own fault; it is a confession that you have been faulty in your technic; if you adhere strictly to every minute detail which has been carefully thought out, and which may seem unnecessary, you will not contract the diseases nor will you transmit them to others." What happened from this part of our investigation? During the college year eighty students made over 800 visits to the bedsides of these highly contagious patients, not one was infected; thirty-five nurses served on an average of forty-six days each on the ward, none was infected; twenty-two doctors from the various clinics and the health service visited the ward, none developed any of these diseases. The three members of my staff were in constant attendance, and in close contact with the cases, making physical examinations, etc. My intern con-

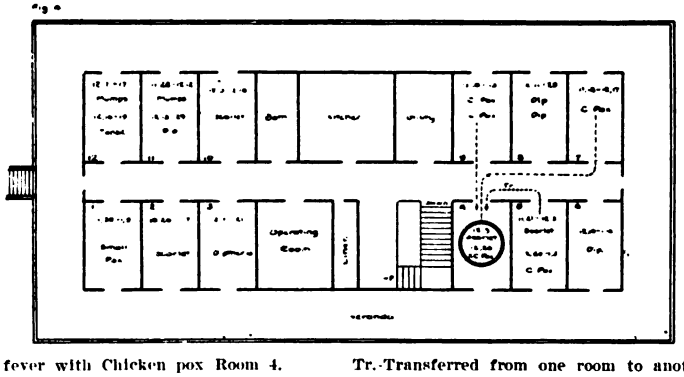
tracted scarlet fever.[2] No infection occurred in our janitor who handled all the infected linen, etc., nor in the maids attending to the cooking and general housework.

Was any disease carried from the contagious hospital to other wards of the University Hospital or to the city? We were constantly fearful that we might carry some malady to other parts of the hospital. We made a careful investigation of each case or series of cases that developed in the hospital. Fortunately it so happened that chicken pox and scarlet fever were the only diseases which required investigation. The long incubation period in the case of chicken pox, which is quite uniformly from fourteen to sixteen days, enabled us to clear up this point. For example: a child enters the hospital six days previous to its outbreak of chicken pox, inference, infection outside the hospital. A child breaks out with chicken pox fourteen to sixteen days after a case is known to have been present in the same ward, inference, infected in the hospital. With regard to scarlet fever, had this disease developed in a non-infected ward to which we were accustomed to go during our attendance upon scarlet fever patients we could not say positively that we had not carried it. In this instance, it fortunately occurred that the source of our scarlet fever cases could be either directly determined, or it could be shown that they developed at a time when there were no scarlet fever cases in the contagious hospital. Dr. Wessinger, our health officer, found no cases in the city which could be traced to an infection coming from the contagious hospital.

What might be offered as a further proof that we did not carry the disease is an illustration in my own family: I took no further precautions after leaving the contagious hospital, my 2 year old child was almost constantly with me during my time at home, she has yet to develop a contagious disease. None of the children I have attended in my practice for a contagious disease had been in contact with me within the minimum or maximum incubation period. This part of our investigation, I think, makes an unusually good showing, and it should eliminate the idea that the contagious hospital is in any way a menace.



4. Diphtheria with Chicken pox Room 4. 3. Chicken pox with Diphtheria.
Tr.-Transferred from one room to another.



Scarlet fever with Chicken pox Room 4. Tr.-Transferred from one room to another.

II. The question which is uppermost in most of our minds is that of our failures. May I preface my remarks by saying: we are not wedded to our beliefs, we endeavor to enter upon our work with open minds. Criticism, if justly given, is the thing which we and all workers in this field desire the most. What degree of efficiency we may now have attained has come through a constant, friendly but serious criticism of each other, and from that

2. Onset of disease March 20. No crosses since December Accordingly this infection was not responsible for a cross.

received from various members of the University Hospital staff. A nurse on service in the contagious hospital is compelled to reverse the order of things in other parts of the hospital, to a certain extent. She is reprimanded if she fails to see and report a fault in her superior's as well as in her inferior's technic. The idea of contamination and cross infection is never out of our minds. During the year which this report covers we have had eight cases of what we have designated secondary diseases. By this we mean diseases developing in the hospital after admission, other than those with which the patients entered; contracted either in the hospital or outside the hospital. By referring to tables II and III it will be seen that five of these cases (two chicken pox, one scarlet fever, two diphtheria) were contracted in the hospital and that all of these cases of cross infection occurred during the months of November and December, our first crowded period. The crosses were as follows:

First Cross.—Room 7, (Case 1541) Chicken pox with diphtheria. Patient entered the hospital November 19, 1914. He had complained of a sore throat before and after entering the hospital. For this reason several successive cultures were made (November 19, 26, 27) all of which were negative. The night of the 27th an exudate appeared on both tonsils. A second culture was taken this day. A clinical diagnosis of diphtheria was made. The culture proved positive. Uneventful recovery. The throat became negative before it was time to discharge him for chicken pox.

Tracing the Cross.

Room 7. There has never been a case of diphtheria in the room. The patient has not been out of his room and entered it from the outside as is the custom. The infection was accordingly brought into the room.

Diphtheria cases in rooms 9 and 4. Nurse A on these cases also cares for patient. This nurse's technic has been very faulty. The other nurse's technic is excellent. See crosses 2 and 3.

Second Cross.—Room 4, (Case 1523) Diphtheria with scarlet fever. Patient entered hospital with nasal diphtheria November 12. He developed a marked case of scarlet fever November 30. The incubation period was accordingly begun in the hospital. Uneventful recovery.

Tracing the Cross.

Room 4. There were two cases of scarlet fever in the adjoining room 5. Nurse A attending cases in this room also cares for patient. The further distribution of cases in the hospital at this time may be seen in Fig. 1.

Third Cross.—Room 9, (Case 1577) Chicken pox with diphtheria. The patient and his brother entered the hospital with chicken pox December 10 and were placed in room 9. He developed diphtheria December 20. There were diphtheria cases in rooms 8 and 6. Nurse A attending these diphtheria cases also cared for patient. Reference to Fig. 2 will show the distribution of cases in the hospital during this period.

Fourth Cross.—Room 4, (Case 1523) Diphtheria with chicken pox. Patient entered the hospital with nasal diphtheria November 12. He developed chicken pox December 26. The attack was very mild. Two cases of chicken pox entered room 9 directly across the hall December 10, just sixteen days previously. In our experience sixteen days has been the almost constant incubation period in chicken pox. The case in room 7 was not infectious at the time this patient entered the hospital. Nurse A who attended cases in rooms 9 and 4 also cared for this patient. The distribution of cases in the hospital at this time may be seen by reference to Fig. 3.

Fifth Cross.—Room 4, (Case 1545) Scarlet fever with chicken pox. Patient entered the hospital with scarlet fever November 21. Room 5. Transferred to room 4 December 3. December 26 he developed chicken pox. Sixteen days previously two cases of chicken pox entered room 9. The patient had been in the hospital thirty-five days. The incubation period was accordingly spent in the hospital. This cross and cross 4 developed the same day. Inference, infected by the same means. Nurse A terminated her services in the hospital January 30.

Discussion.—It is not our purpose to lay all our cross infections at the door of Nurse A. It is rather convincing circumstantial evidence, however, that she was responsible for most of the crosses. She was not an incompetent nurse. Her work on other wards had been satisfactory. She would not, however, follow the technic of the contagious hospital and she made many serious blunders. Because of her past good record we did not dismiss her from the service. We hoped we were wrong in our judgment of her. Another source of cross infection might be traced to our night superintendent. This nurse attended to all the patients on the ward during the night, unless it was necessary to have night specials. She visited all of the patients and might have carried a disease from

one room to another. If this was the case should we not also expect to have cross infections in the south end of the building as well as in the north end where all the crosses occurred? The same argument might be applied to the intern. It is quite reasonable for us to expect that those who are the most constantly in touch with the patients are the most likely to carry infection. These are the nurses and interns.

The cross infections cannot be traced to the students because during their visits to the hospital several individuals are assigned to watch every movement they make. It is noteworthy that the students make few breaks in technic. It is also not impossible that the staff, I include myself, may have been responsible for a cross infection. I think, however, that this is less likely for reasons given before.

That cross infections occurred in no way disproves the practicability of the theory upon which we have been working. It does on the other hand show the danger we are constantly subjected to from our dependence upon the human equation. We have learned much. The most important thing we have learned is that it is not every one who can master this simple technic. Some nurses cannot compass it. As some individuals perfectly sound mentally and brilliant in other lines are stupid in arithmetic or spelling, so we find nurses perfectly capable in all other ways, and willing to learn, who are absolutely devoid of the sense of contamination as applied to contagious cases.

The surgeon protects his operative field for the benefit of his patient and his hands for the benefit of himself. He pays little attention to his gown or the furniture he touches with it so long as he does not infect the field of operation. He who carries out aseptic technic as applied to contagious cases recognizes a difference. While the principles are exactly the same they go a little farther. In this instance the one observing the technic is constantly on the watch to see that he touches nothing without assuring himself that the thing he touches touches nothing else. We are all familiar with the consternation of the surgeon when some one comes in to view his operation and voluntarily assists with unsterile hands. He feels that "it is all up with the job." We experience exactly the same feeling when a person comes into our contagious fields, touches a bed with his gown, leaves the room without washing his hands, picks up the sterile chart in the corridor, leans up against the sterile wall of the corridor, and insists upon conferring with the nurse about some statement on the chart which he does not understand, and unintentionally listens so closely that he touches the hem of her garment. For us this means in the first place an attempt at diplomatic language, an effort to instruct so that the offense may not be repeated, and a gentle speed to the parting guest. But this is not all. In the second place it means that the walls must be scrubbed, the charts fumigated or recopied and that the nurse must change her uniform, because when a nurse is in the corridor she is uncontaminated. The success of the hospital depends upon these very simple, and yet at first sight seemingly complicated rules. This brief reference to the underlying principles of our technic will explain to you why we may appear ill at ease when a stranger to our methods enters the ward.

The final questions we should ask are: has the hospital under the aseptic technic method been a success; and how can the efficiency of the hospital be improved?

The report speaks for itself; 2.23 per cent. is not a high rate of cross infections. It is, however, too high. There should be no cross infections, and this is perfectly possible with perfect technic. Since the last recorded cross in this report we ran to within a few days of a year without a cross infection. That cross was chicken pox. During the most crowded time covered by the report (March and April) we had no crosses. At one time we had small pox, chicken pox, scarlet fever, erysipelas, mumps and diphtheria in the ward at the same time and no crosses occurred. I think we are compelled to say that the hospital has been a success under the aseptic technic method.

How can its efficiency be improved? More and better help and a new building or an addition to the present one. We should have one ward to isolate such diseases as chicken pox and measles. These diseases will always give us trouble. There were times during the period covered by this report when our hospital was crowded. There have been times since last June when we could not accommodate all the patients who were sent to the hospital. We should at least double our present bed capacity.

A glance at table 2 shows that the Palmer ward furnished the largest number of cases, (68) from one locality. The entire University Hospital sent 101 cases or approximately 41 per cent. of the total number of cases. The Health Service came third with sixty-two cases, forty-six of which were specific contagious dis-

eases; forty-seven of the cases from Palmer ward were specific contagious cases.

It will be seen that the Palmer ward is the greatest center of infection to the University Hospital. It always will be, for these exanthematous diseases are almost essentially diseases of childhood. It is impossible to head off the first case until it develops and then the mischief is done. For the good of the hospital as a whole it is a great mistake not to see to it that the best conditions possible be obtained for handling the cases which come to this ward, now the largest in the hospital group. We need one or two empty clean wards to which cases not exposed, or vice versa as the case may be, can be moved on short notice. These, I believe, should be the first rooms provided whether we increase our bed capacity or not.

The benefit of the hospital to the City of Ann Arbor is apparent. Ninety-nine cases, eighty-four of which were specific contagious diseases were removed from places where absolute isolation could not be carried out, and thus this many centers of infection controlled. The homes, fraternity houses, and rooming houses. from which these cases came were realesed from quarantine within very short periods and their economic loss reduced to a minimum.

The benefit to the University is also quite apparent.

To the University Hospital as a whole the advantages of the contagious hospital are hard to enumerate. At another time I hope to consider with you our methods of carrying out our work in the hospital with the hope of a free discussion as to ways and means whereby we may serve your needs more perfectly. The severest kind of a test possible, I believe, has been given the aseptic technic method in our hospital. In tracing our cross infections, air currents could be eliminated as probable factors. The prevailing winds are from the West.

In closing I wish to thank the members of the clinical staff for their coöperation and helpful criticisms throughout the year and to acknowledge the painstaking and skillful help of my former instructor, Dr. Albert A. Beifeld.

DISCUSSION.

Dr. Reuben Peterson: We certainly are under great obligations to Dr. Cowie for this very interesting report. My interest in the contagious hospital came through my executive position in the General Hospital, and as the history of the building of the contagious unit of our Hospital is rather interesting and probably unknown to most of you, possibly I may be allowed to sketch it in a few words.

The City of Ann Arbor gave to the University twenty-five thousand dollars for the erection of a contagious hospital, the University to furnish the site and plans. At that time I do not think any of us had a very clear conception of what was needed or could be erected for the sum given. The first plans submitted were very curious in the light of what were afterward adopted. They provided for three hospitals, each entirely separate and with its own equipment, the idea being that the different contagious diseases were to be treated in their own distinct units. Among other things it was planned that the students were to gaze at and study the contagious patients in an amphitheater through a glass partition, a very different arrangement from the one Dr. Cowie has outlined this evening. There seemed to us nothing incongruous in this scheme since we had the idea that the diseases must be separated and the students protected and prevented from carrying the diseases to others. Fortunately, however, as it finally transpired, the plans had to be abandoned since they called for an expenditure of one hundred thousand dollars, four times as much as we had at our disposal.

So it fell to my lot as executive officer of the Hospital to see what could be done. In brief I visited all the large contagious hospitals in the East, and found most of them using the unit system, separating the patients with the different contagious diseases, and taking elaborate precautions against cross infection. In Providence, however, I saw a hospital where one pavilion was conducted upon the medical asepsis plan Dr. Cowie has described. So successfully had this plan worked out that I became very enthusiastic, for I saw its possibilities of adaptation to our own situation. Upon my return the plan was submitted to Dr. Cowie and the other clinicians connected with the Hospital with the result that the present contagious hospital was erected. In one way it was a great risk for it was an entirely new idea to this part of the country. We are certainly indebted to Dr. Cowie and his assistants for developing and carrying out the present technic and demonstrating beyond a shadow of a doubt that it is the right theory of treating contagious diseases in connection with a general hospital such as this.

In the old days before this hospital was built and especially in recent years when there was a great increase of patients in all departments of the Hospital, especially in the Pediatric Department, outbreaks of contagious diseases were inevitable. The Hospital had to be quarantined quite frequently which meant a great financial loss as well as great injury to the teaching in the Hospital. Some of you will remember these horrible conditions, although we are apt to forget as soon as the situation is taken care of. How abused we would feel now if we had to quarantine the Hospital for scarlet fever and do as we once did, board up the summer houses just west of the interns' home for a contagious disease ward. Even if the University had been obliged to pay twice the cost of the contagious hospital we would be better off financially because through this building we have escaped quarantines.

Dr. Cowie is correct in the statement that there will always be danger of cross infection in a hospital such as ours unless the technic be carefully carried out. The same is true in the operation room, where infection occurs less frequently because the medical profession has been educated in surgical

technic during the past twenty-five years. When a bystander poked a finger into the wound years ago, it was done through ignorance which now has almost entirely disappeared through the proper education. But physicians have not been educated in this newer medical asepsis, so essential in preventing cross infection in the contagious diseases, and commit all sorts of blunders unless they are watched. Dr. Cowie and his assistants are as much pioneers in this medical asepsis as some of us were in the old days in surgical antisepsis and asepsis.

Who has not seen nurses in an operating room apparently totally unfitted for surgical work? No amount of training will fit the doctors and nurses of a certain type for aseptic work. They may have an intellectual grasp of asepsis but their hands can not be trained to carry it out. If a nurse after a fair trial can not be taught she should be banished from the surgical and contagious services in order to safeguard the patients.

In one way it is easier to carry out the technic of medical asepsis when the patients are separated from each other merely by glass partitions or screens, since the close proximity of the patients is a greater reminder of the danger of cross infection than when the patients are in separate rooms. That the germs from these various contagious diseases are not airborne is demonstrated by our hospital where there are constant cross currents due to the doors of each room opening out onto the porch and central corridor. It was a question whether the porch should be built since it added greatly to the cost of the hospital but I think it has proved to be one of its most advantageous features.

I am inclined to think that in the future it will be much easier to disinfect the rooms by washing the walls after the latter have been properly prepared with enamel paint which lack of funds has prevented up to now. It is particularly interesting to see how in this building it has been demonstrated that no longer is it necessary to disinfect a room through fumigation, an expensive and always dangerous procedure in spite of every precaution against fire. No case of cross infection has been traced to this source although the different rooms have been used indiscriminately for the different contagious diseases. So well has the method of disinfection by washing worked that it has entirely superseded the old fumigation methods in the General Hospital, no matter how violent the case.

We shall always be in danger of an outbreak of contagious disease in the Palmer Ward for Children until Dr. Cowie's request for an isolation ward be granted. Since one cannot say positively that a child is not in the incubating stage when admitted to the Hospital, the only safe way is to keep him in the observation ward until it has been proved that he is free from a contagious disease. If our present system is continued, there will always be danger of infecting an entire ward of children since it is too late when the disease once manifests itself to prevent the exposure of the other patients.

I hope Dr. Cowie will follow this paper by another in which the technic is fully set forth, for the profession and public are intensely interested at the present time in this new method of treating contagious disease, since by this technic it becomes possible to treat a variety of contagious diseases under one roof with the minimum amount of danger of cross infection and at a minimum expense for construction of the hospital building.

Dr. Harry B. Schmidt: I well remember the difficulties we had to contend with before the contagious hospital was built. I think it would be very interesting to make note of the cross infections that occurred in the Hospital before its establishment.

Dr. Carl H. Laws: I should like to say that Dr. Cowie's report is remarkable compared with the reports from contagious hospitals, with the glass partitions. There are innumerable crosses that develop between diphtheria and scarlet fever and the technic is the usual technic carried on in institutions of this order. When I first arrived here the technic seemed far stretched, but now I can see the wonders of it, the small number of cases of cross infections we do have, and what it means to carry out the technic in all its details in order to prevent these cross infections. The statistics from contagious hospitals and institutions throughout the country will show a larger percentage by far of cross infections developed under the old plan compared with the few cases that have developed under the new technic.

Dr. Cowie: I have nothing further to add except to say that I omitted to compliment the nursing staff. These nurses are doing remarkable work in the contagious hospital and each month their efficiency increases. It is owing to their careful watchfulness that the hospital has been able to make the record that it has.

With regard to the nurses breaking technic. We have a rule now that overcomes this to a large extent. Every nurse that comes to the contagious hospital is put on probation. She serves two weeks. If her technic is not good, it is asked that she be assigned to some other service. We have had to put this rule into operation more than once.

REPORT OF A CASE OF DIBOTHRIOCEPHALUS ANEMIA.

Harry B. Schmidt, M.D.

(From the Department of Internal Medicine, University Hospital, Ann Arbor, Michigan.)

This patient is a Finnish woman. Her color and panniculus in no way differs from that seen in cases of pernicious anemia. The fact that she is Finnish led us to suspect that she might possibly have a bothriocephalus infection. We have been looking for this infection here for a number of years, and I am not aware that there has ever been a case of the kind in the Hospital before. We found many eggs in her stools, four or five to a field. Previous to the stool examination, we examined a blood smear and Dr. Gilbert and I both concluded that it was not typical of pernicious anemia. One of the interesting features to me was the absence of an eosinophilia.

She is 38 years of age and came to this country fifteen years ago. The present trouble began in March, 1913 following the drowning

of her son. At that time she saw his remains removed from the water and suffered a hemorrhage from the nose, then became unconscious. Following this she was very weak and had to take to her bed. There was a gradual recovery from these symptoms, but since then she has noticed shortness of breath, palpitation of the heart, roaring in the ears, occasional dizzy spells and increasing pallor. There are no stomach complaints, diarrhea nor constipation.

Upon examination, the patient shows a pronounced pallor of the mucous membranes and skin, together with a lemon yellow color, which is most marked over the face. There are no other evidences of disease except a slight increase in the heart rate and hemic murmurs.

Blood examination: red cells 810,000, white cells 7,500 and hemoglobin of 20 per cent. Color index is less than one. Differential count of 200 cells shows 23 per cent. small lymphocytes, 3.3 per cent. large lymphocytes, 6 per cent. transitionals, 45 per cent. polymorphonuclears, 2 per cent. eosinophiles, 11 per cent. neutrophilic myelocytes, 3.5 per cent. normoblasts, 6 per cent. megaloblasts, marked poikilocytosis and some anisocytosis and marked polychromasia. The size of the red cells are normal or below normal, no macrocytes seen.

The urine is negative. Systolic blood pressure 178, diastolic 90. Wassermann reaction was doubtful.

This disease is rare in North America although we live in a locality where Nickerson, the first in the United States to study it carefully, reported that the infection most frequently occurred in the Great Lakes region. There are very few cases reported in the literature. It must be that many have failed to report their cases so that this would be the reason for its apparent rarity.

The disease is not rare around the Black Sea, in Russia, Finland and Switzerland. It is the commonest tape worm found in Japan. The infection is obtained by eating raw or smoked fish and I understand that this is a common occurrence among the foreign population in the Upper Peninsula of this State. In America the disease is almost invariably found in foreigners, the majority of whom are Finlanders.

Dr. A. S. Warthin of the University of Michigan has reported the infection of fish with the bothriocephalus cysticercus and has also noted the disease in native Americans.

The bothriocephalus was first observed in this country by Dr. Walker in 1879, and since then numerous cases have been reported, mostly around the Great Lakes region. This worm is the longest of any of the tape worms. Wilson has reported a case of multiple infection, one of the worms measuring eighty-three feet, two inches in length.

The symptoms of the disease as described in most textbooks are variable. There is hardly a subjective symptom described which has not been at sometime or another attributed to this infection. Many books on clinical microscopy and medicine state that the blood picture may be identical with that of pernicious anemia. I take exception to these statements. I can find no instance in the literature of a case with an anemia exactly resembling pernicious anemia. The diagnosis is made on the high color index, polychromasia, poikilocytosis, anisocytosis and large numbers of nucleated red cells, the majority of which are usually megaloblasts. The diagnosis of pernicious anemia cannot be made upon these findings alone without question.

Many cases of pernicious anemia are seen in this Clinic each year and I have yet to find a case which did not have large numbers of macrocytes in the blood on every examination. The finding of large numbers of megaloblasts in the anemia, due to the bothriocephalus is the rule; however, one will observe that this occurs when the anemia is taking a progressive downward course. Directly the opposite happens in pernicious anemia. When the hemoglobin and red cells are on the incline, nucleated red cells are seen in showers.

This patient has the achlorhydria so often described as accompanying pernicious anemia. The paraesthesias and other nervous phenomena found in this disease, due to posterior lateral sclerosis, are absent in this case. I have been unable to find an instance in the literature where this lesion was described as due to the bothriocephalus infection or to the anemia accompanying it.

The absence of an eosinophilia which is common to this disease, interested me particularly. In trichinea infection the eosinophiles do not appear until after the disease has reached its apex. It is not uncommon to find high percentages of these cells in the blood after the patient has recovered from his illness or at least from the symptoms accompanying it. An absence of eosinophiles in the blood has also been described in the late stages of the most severe forms of secondary and primary anemias, and some authors claim that the eosinophiles reappear during the stage of recovery and state that this is a good prognostic sign. I was sorry that this patient left the Hospital before we

could determine the possibility of an eosinophilia during her convalescence after the worms had been removed.

Following the usual treatment with aspidium, we recovered four worms from this patient. I will pass the specimens around for your inspection. You will observe that the rosette shaped uterus which so easily distinguishes this worm from all other tape worms is conspicuous, also that the heads are very tiny as compared to the head of the tenia saginata.

I might state that the low color index here observed, is not uncommon in cases of pernicious anemia whenever the red cells are below a million per cubic millimeter, also that we have no reason to suspect that the patient acquired her infection here in America.

DISCUSSION.

DR. FREDERICK A. WALDRON: How do you account for the positive Wassermann?

DR. SCHMIDT: The Wassermann in cases of severe anemia, especially anemias due to a toxic substance, are usually positive.

DR. D. MURRAY COWIE: Has it been determined whether the eosinophilia in the case of this worm is an anaphylactic affair as it is in the case of some other worms?

DR. SCHMIDT: The disease is so rare in this country that not many cases have been studied by one man.

PUERPERAL INVERSION OF THE UTERUS; REPORT OF A CASE.

R. A. BARTHOLOMEW, M.D.
(From the Clinic of Obstetrics and Gynecology, University Hospital, Ann Arbor, Michigan).

Puerperal inversion is an occurrence of particular interest on account of its infrequency and seriousness. Probably the best source of material for the study of this condition is to be found in Thorn's article, "On Inversion of the Uterus," which is based on a critical study of 627 inversions of the uterus collected from the world's literature from 1887 to 1909. Of these, 543 occurred in connection with pregnancy, 83 cases with tumors, and 13 idiopathic.

Frequency.—While all authorities agree that puerperal inversion is a very rare complication, the figures as to its frequency vary within rather wide limits. Zangemeister on the basis of Thorn's statistics estimated the condition occurred about once in 400,000 labors, assuming that the seventy-six inversions reported from 1887 to 1909 in Germany represented the great majority of the cases. Not a single case was found in 250,000 labors in the St. Petersburg Lying-in Hospital, and the condition was observed but once in 190,833 deliveries in Dublin. Inasmuch as the condition is quite readily diagnosed, and is almost certain to come to notice, on account of the severity of the symptoms, both in the acute and chronic stage, it is probable that these figures fairly well represent the frequency of inversion. It is well to bear in mind the extreme infrequency of the complication for this fact alone is certainly not in accord with the prevailing conception of the causative factors.

Etiology.—It has not been possible as yet to assign any one important factor as the cause of the condition. In considering the numerous factors commonly mentioned in the etiology it will be convenient to consider them from the standpoint of predisposing and exciting causes.

According to Thorn, the most important predisposing cause is to be found in the fundal attachment of the placenta. Out of 191 puerperal inversions, the area of attachment of the placenta to the uterus was observed in forty cases, in thirty-three of which the placenta was specifically mentioned to be attached to the fundus. This particular area of the uterus, already more predisposed to inversion, by its location, than the rest of the uterus, would have an increased tendency in this direction due to the increased vascularity and softening at the placental site. Furthermore, if there is any tendency for the placenta to remain adherent over a small portion, the contractions of the uterus in attempting to expel the partially separated placenta, would tend to pull down on this weakened area and bring about partial inversion. Similarly the uterus would have a tendency to contract upon the partly inverted fundus, in much the same way as upon a foreign body and attempt to expel it, thereby completing the inversion. A striking analogy to the action of the uterus, upon a partially separated placenta, attached to the fundus, is seen in the fact that in the eighty-three cases of inversion of the uterus, with tumors, seventy-nine were found to be myomas, and in sixty-three of these the attachment of the tumor to the uterus was in the fundus. It is also noted that inversion of the uterus is almost three times as frequent in primiparae as in multiparae, and is possibly explained by the fact that due to the more complete approximation of the walls of the cavity of the virgin uterus the fertilized ovum is more apt to become imbedded near or at the fundus. On similar grounds it has been thought that the increased frequency of placenta previa in multiparae may be accounted for by the greater separation of the walls of the uterine cavity, thus favoring a

lower attachment of the ovum. Normally, the placenta is attached to the anterior or posterior wall of the uterus, and only exceptionally to the fundus.

The exciting causes are traction on the cord, or pressure from above on the fundus. Traction on the cord may be due to the cord being absolutely short, in which case the placenta is inevitably pulled upon as the child is born, or before the cord is cut. The cord may be relatively too short, due to an abnormal number of coils about the child, or in case birth occurs with the mother in a standing position. In many cases the responsibility appears to be with the attendant who pulls upon the cord to deliver the placenta. Probably even in these cases there would be no resulting inversion unless the placental site be in the fundus and the uterus in a relaxed condition.

Pressure from above on the fundus may be an exciting cause, as for example in the Credé expression of the placenta, attempted while the uterus is in a relaxed condition with a placenta which may or may not be situated in the fundus. In a number of cases reported, the exciting pressure has merely been that brought about by coughing, sneezing, micturition or straining at stool during the puerperium. Thorn holds that in such cases there has already existed a partial indentation, or inversion since the labor, and one of these factors completes the inversion. His theory is supported by the fact that a noticeable indentation of the fundus has been palpated and known to remain for a considerable length of time before correcting itself spontaneously.

Thorn believes that there has been a tendency to overemphasize the importance of errors in the conduct of labor, and that if traction on the cord, either intentional or unintentional, and undue pressure from above on a relaxed uterus were of primary importance, then the condition would be more frequent than satistics show. It is also significant that out of 437 cases only 154 were violent, that is, due to traction on the cord or pressure on the fundus; 180 were spontaneous, and as nearly as could be judged from the description, independent of manipulation, and in 103 the question of the inversion being spontaneous, or due to violence, was uncertain and not stated definitely. Beckmann, quoted by Thorn, found twice as many spontaneous as violent in his statistics. The mere fact that in a large proportion of the cases the labor has been conducted by midwives who have presumably erred in their technic does not have so much significance, when one realizes what a large proportion of labors are still conducted by midwives. It is only too easy to put the blame on the midwife and base it upon hearsay evidence. There is no evidence to show that the condition is becoming any less frequent than formerly with continued improvement of obstetric technic. The inversion has been known to recur one or more times in subsequent labors in the same patient as though there was a special predisposition to inversion in some cases, possibly due to abnormal structure of the uterus, as for example, in arcuate uterus. It would seem important to make a special investigation of some possible pathologic structure of the uterus whenever such a specimen can be obtained in cases that come to autopsy. There are a number of cases on record in which inversion occurred at the first labor, and in a subsequent labor, in spite of the knowledge of the previous complication and in spite of all precautions to prevent its recurrence it has happened again. Carruthers has reported such a case.

Clinical Course and Diagnosis.—The occurrence of the inversion is usually accompanied by very definite and marked symptoms but strange to say in a large number of cases there have been no symptoms whatever or else of so mild a type as to make an examination unwarranted. In Thorn's statistics there are statements in 191 cases as to the time of the diagnosis of the inversion. In 19, the inversion appeared directly after the birth of the child; in 44, directly after the expulsion of the placenta; and in 141, up to the twelfth hour. Undoubtedly the diagnosis would have been made much earlier in many of these cases had there been symptoms marked enough to have suggested an abnormality.

The occurrence of the inversion in the more typical cases is manifested by severe pain, and the patient rapidly passes into a state of profound shock, accompanied by more or less hemorrhage from the uterus. However, the shock is usually far more marked than would appear to be caused by the amount of hemorrhage. It is the hemorrhage, and especially the shock, which constitute the immediate dangers to the patient. Such symptoms lead to, or should lead to, an examination at once, and the body of the uterus may be found to have disappeared from the lower abdomen. It is often possible to palpate the inversion funnel and carry the hand down into the depression, noting its circular rim. The inverted body of the uterus may be discovered protruding from, or situated entirely outside the vagina between the patient's

thighs. On vaginal examination it may be felt filling up the vagina and bulging the perineum, the openings of the tubes may be seen or felt, and on passing the fingers along the mass toward the vault of the vagina, the soft cuff of cervix may be felt encircling the mass. There is apt to be a continual oozing of blood from the surface of the mass. The placenta, if not previously expelled, is found adhering to the surface of the mass.

Treatment.—Before taking up the treatment it is important to consider what may be accomplished in the way of *prophylaxis.* It is worth while to re-emphasize the possible dangers of making any traction whatever on the cord after the child is born, and to take measures against traction on an absolutely, or relatively short cord at the end of the second stage of labor. Also there is the possible danger of carrying out a vigorous Credé method of separation or expulsion of the placenta with the uterus in a relaxed condition. The uterus should always be made to contract before subjecting it to pressure from above, for it is doubtful whether a firmly contracted uterus can be inverted. It is important to follow the uterus down with one hand while the child is being born, but to avoid any unnecessary manipulation, or stimulation of the fundus until there is evidence of the spontaneous separation of the placenta as may be judged from the contraction and rising up of the fundus along with a slipping out of the cord from the vulva, and usually the appearance of a dark bloody discharge. Slight pressure on the fundus will induce an advance of the cord which will not recede on release of pressure if the placenta has separated. More important still is the recognition of the beginning stage of the inversion as may be seen from the reported case, and also others in the literature, for example that of Carruthers. If the hand rests on the fundus any peculiarity of its contour may be readily recognized except in case of very heavy abdominal walls, or a full bladder. The beginning inversion is practically always in the fundus, and the presence of a firm transverse ridge, high up on the body of the uterus is very suggestive. Above this ridge there may or may not project a portion of the fundus much the same as a rubber nipple may be partially inverted, leaving the end still projecting slightly beyond the level of the reflection. If such a structure can be palpated an inversion is threatened, and I do not think the attendant is justified in continuing further efforts by pressure from above but should quickly undertake a manual removal of the placenta before the inversion progresses any further. Such a procedure would certainly be less dangerous to the patient than the inversion. Even with a beginning and only partial inversion there may be a greater degree of shock and hemorrhage present than could be accounted for in any other way, as may be seen in the reported case. Thorn mentions similar findings in a case, and, believing that an inversion was threatened, made pressure in the reverse direction from the symphysis toward the promontory of the sacrum with successful result.

The treatment commonly advised in most textbooks is that of an immediate manual replacement of the uterus, and the fact is almost ignored that in a large number of cases the shock and hemorrhage may demand much more urgent treatment than the inversion itself. Zangemeister, from a study of Thorn's collected cases, strongly advised treating the shock and hemorrhage first, and choosing a time from one to twenty-four hours after the occurrence of the inversion to replace the uterus. In support of this idea he quotes the following statistics based on 158 of Thorn's collected cases:

	Failures	Deaths
Reposition at once	24%	23%
Reposition after 1-24 hours	14%	0%
Reposition after 1-14 days	40%	20%

Such statistics point very clearly to the great advantage of waiting one to twenty-four hours and not replacing the uterus at once.

Allman, however, not willing to grant such absolute deductions made an independent study of the same statistics covering 268 cases with entirely different results:

	No.	% Fail.	% Deaths
Reposition at once	139	13.6	20.1
Reposition after 1-24 hours	23	13	30
Reposition after 1-14 days	34	35.3	20
Reposition after 14 days	72	56	6.9

In other words, reposition after 1-24 hours had not only fully as many failures as if done immediately, but the mortality was 30 per cent. instead of 0 per cent.

In order to discover, if possible, how such a difference could be accounted for, regarding such an important phase of the treatment, I made an independent investigation of the same statistics from Thorn covering 255 cases with results corresponding very nearly to those obtained by Allman:

	No.	Fail.	Deaths
Reposition at once	131	12%	22%
Reposition after 1-24 hrs.	20	15%	25%
Reposition after 1-14 days	31	23%	22%
Reposition after 14 days	73	59%	4%

The difference in results between the last two tables and the first one might easily arise according to the interpretation of the abbreviation, p. p. (post-partum) used in Thorn's table, to designate the time of the discovery of the condition, but the inference in these cases was that reposition was attempted at once after the diagnosis was made following delivery.

From this, it would seem that, contrary to Zangemeister's results reposition undertaken 1-24 hours after delivery, has an even higher percentage of failures and deaths than if done immediately. The fact probably is that some cases of inversion are accompanied by very little shock or hemorrhage, and in these there is no contraindication to immediate replacement. In others there is a profound degree of shock when the inversion takes place, and if immediate replacement is attempted, there is added to the original shock a further amount caused by the replacement, and thus the patient is overcome. This is well illustrated in the case reported.

Phillips collected 184 cases of acute puerperal inversion. In 79 in which the uterus was immediately replaced in the presence of marked shock, 24 or over 30 per cent. died. In 23 cases, in which it was definitely stated that there was no shock, immediate replacement resulted in recovery in each instance. In one case it was specifically stated that replacement was purposely postponed until the severe shock had passed off, and this patient recovered.

If shock is present the replacement should be postponed and the shock treated by the usual restorative measures. If the amount of hemorrhage is threatening during this time it may be readily controlled by constricting the uterus just below the cervix with a piece of sterile rubber tubing, using just enough pressure to control the bleeding and not shut off the blood supply to the rest of the uterus. Such bleeding, not being controlled, would further increase the shock, and might account for the increased mortality in replacements postponed for a short time. The absence, or slight amount of the hemorrhage in many cases, is explained by the constricting effect of the inversion at the lower segment. This may be marked enough in some cases to lead to gangrene of the uterus. Tamponing with gauze may be sufficient in some cases but in others constriction is necessary.

After the patient has recuperated, replacement should be attempted. In any case it should be done under anesthesia to secure as complete relaxation as possible and lessen the danger of shock to some extent. If the placenta is still adherent it should be removed before replacement is attempted, thus making a smaller mass to be pushed through the constricting ring above. The separation of the placenta may set up contractions which should be allowed to subside before attempting replacement.

As to the actual technic of the replacement, there are almost as many methods recommended as cases of inversion. All may have their special advantages, and what would be suitable in one case would be unsuccessful in another. In any case care should be observed to press with as broad a surface of the fingers as possible to avoid perforating the uterus and not to use much force if the uterus is in a state of contraction. The replacement proceeds more easily and rapidly when the muscle is relaxed. The hand should be left in the uterus until the latter is felt to contract firmly and maintain its normal contour. In case of persistent tendency to reinversion it should be packed. After the immediate danger of hemorrhage and shock is passed, there is the possibility of sepsis favored by the exposed endometrium and the manipulations, sometimes carried out with uncertain asepsis. However, the mortality from sepsis is much less than that from hemorrhage and shock. The more chronic the inversion the more difficult it becomes to replace manually, and in such cases the replacement is more easily and quickly performed by operation, the technic of which is fully described in an article by Dr. Peterson, published in *Surgery, Gynecology and Obstetrics,* August, 1907, pages 196-213.

The following is the report of a case which recently occurred in the Maternity Hospital:

The patient, O. L. 22 years of age, was a primigravida; rather large build, physical condition good, pelvic measurements fully normal, urine and Wassermann negative. Family history and personal history negative. Menstrual history normal, last period probably March 15, 1915; course of pregnancy normal and uneventful. Pains began about 3 a. m. January 7, 1916 and were soon established regularly at five minute intervals. At 9:30 a. m. abdominal examination showed the position to be O. L. A., head well engaged, fetal heart 135 per minute, and the pains coming at three to four minute intervals, and lasting about forty-five seconds.

Rectal examination showed the cervix one-third dilated, and the membranes unruptured. Progress continued rather slow, but at 2 p. m. rectal examination showed the cervix fully dilated. Very soon after this the membranes appeared at the vulva and were artificially ruptured. At 2.45 p. m. there was beginning crowning which continued steadily with each pain until at 3:30 p. m., when the head was delivered between pains with the patient under the obstetric degree of anesthesia. There was no coil of cord around the neck, and with the next pain the child was born in the usual manner. It was a healthy appearing male infant, weighing seven and one-half pounds and cried at once after birth. The fundus was followed down with the hand as the child was born and remained of normal contour and consistency. There was no bleeding and the fundus required no manipulation nor stimulation. After waiting about five minutes the cord was tied and cut and the child removed. A moderate amount of pressure was then made on the fundus but apparently the placenta had not yet separated as the cord receded at once with release of pressure. The effort was not continued but the patient was anesthetized, and a rather severe second degree laceration repaired in the usual manner. A moderate bleeding was noticed which became more marked after the repair. There were as yet no definite signs of separation of the placenta, and with release of pressure on the fundus the cord receded each time. It was remarked that the upper portion of the uterus seemed somewhat wide on palpation. There continued to be an abnormal amount of hemorrhage but efforts to express the placenta by the Credé maneuver were unsuccessful. It was soon deemed necessary to do manual removal of the placenta and the usual preparations were made. A final attempt at expression was made, however, before resorting to manual removal, and at this time about 4:15 p. m. it was noted that the patient appeared in a condition of moderate shock, with pallor, shallow respirations and a pulse of 130-140 and of rather poor quality. On palpation of the fundus a definite thick transverse ridge could now be felt just below the fundus and too high for a contraction ring, the fundus projecting somewhat beyond the level of the ridge. This peculiar finding was discussed at the time and was probably the beginning of the inversion but was not recognized as such. With another effort at expression, with the uterus only moderately firm, the placenta appeared at the vulva, coming out by the Schultze method. It was noted that it was very hard to find the fundus after the placenta appeared, but this was attributed to the straining efforts the patient was making at that time. The placenta appeared to be intact, and although the cord was not measured, it was of the usual length. However, the bleeding continued and one hypodermic of ergone was given. In trying to locate the fundus the perineum was noticed to bulge as though another head was about to appear. At this time the patient was in serious condition, pallor very marked, pulse 160 and almost imperceptible at the wrist. Vaginal examination was made at once, and revealed a large round, thick, dense mass presenting at the vulva bulging the perineum, and completely filling the vagina like an immense polyp. No cervical rim could be felt until the examining finger was carried far up into the fornix, and then the condition was clearly recognized as inversion of the uterus. The patient was put more fully under anesthesia and after a preliminary cleansing of the parts the inverted fundus was pushed up, with the back of the flexed fingers of the right hand, the pressure controlled by the left hand on the abdomen until the fundus was nearly on a level with the cervical ring. At this time, by abdominal palpation, the inversion funnel could be easily recognized and outlined with the fingers; meanwhile ten ounces of saline solution were being given under the right breast. Further pressure was now made on one side of the inverted part, at the level of the reflection, in an inward and upward direction with the back of the flexed fingers, and the fundus was soon felt to resume its normal position by a rather sudden jerk much as the indentation in a rubber ball suddenly disappears. The replacement was accomplished after about five minutes' effort, and it was noted that whenever the muscle contracted it was very difficult to continue the replacement. With massage the uterus was felt to contract down and the hand was slowly withdrawn. The patient appeared to be past aid by this time. No radial pulse could be felt, and by stethoscope the heart rate was 180-190 and weak, respirations very shallow and weak. She was given one cubic centimeter of pituitrin intravenously, also adrenalin ten minims of a 1-1000 solution, ergone, one hypo, which was soon repeated, then ten ounces of saline solution under the left breast, and morphine grains one sixth hypodermatically. She was surrounded by hot water bottles and the feet held in an elevated position. Within fifteen minutes she reacted and improved steadily. One-half hour

later she was put to bed with a pulse of 140. She was very thirsty, and water was freely given in small quantities as she retained it well. Thereafter, there was daily improvement, and although the puerperium was complicated by a mild sapremia with foul discharge and moderate temperature, involution was satisfactory and the laceration healed well. The patient was allowed to go home on the sixteenth day. It was noted on examination at that time that the fundus was in normal position but could be displaced very easily.

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DISCUSSION.

Dr. Reuben Peterson: There is very little to add to this very complete paper. It is the only case we have had in the Maternity Service since 1901. While the condition is uncommon, like any other obstetric complication, one may be so unfortunate as to meet with one or more cases in practice, hence he should have definite knowledge as to the causation and treatment of the condition.

I do not believe the accident in the case reported occurred from any error in technic but rather from some anomalous condition in the fundus of the uterus which resulted in the inversion. Certainly the Credé method of delivering the placenta cannot be responsible for the accident, when one considers the thousands of cases where this method is employed by anything but skilled hands yet with no resulting inversion. The same is probably true of the method of delivery of the placenta by pulling on the cord, since this is a common practice among midwives, yet inversion even in their practice is uncommon. However, it is well to bear in mind that all procedures such as excessive pressure on the fundus or pulling on the cord should be avoided, since such methods plus an abnormal softening of the upper part of the uterus may bring about inversion.

Dr. Bartholomew's statistics are exceedingly interesting and instructive and bear out his contention that each individual case of inversion must be judged by itself so far as treatment is concerned. It is quite possible that his patient was not in as serious a condition as he supposed, i. e. she probably had good recuperative powers because the hemorrhage was not excessive and the cause of the shock was soon removed. While it is probably best to wait awhile in the majority of cases of inversion until the shock can be overcome, there is danger in waiting more than a few hours, so rapidly does the uterine muscle contract, making it much more difficult to replace the uterus. This difficulty is increased if ergot has been given to control the hemorrhage. The latter can be quite easily curtailed by packing or by employing the method of constriction described by the essayist but the danger of sepsis through packing must ever be borne in mind. If one is obliged to wait longer than twenty-four hours after the accident, it probably will be better to wait until after the fourteenth day of the puerperium. Then, as the statistics show, replacement can be made by operative procedures with a low mortality. This is undoubtedly due to the fact that sepsis is much more prone to occur earlier in puerperium.

While the case reported is an acute, not a chronic inversion of the uterus, it may not be out of place to state that the operative treatment of the latter condition has been quite thoroughly worked out. The purpose of the various methods is to cut the constricting cervical ring and enough of the uterine wall to allow of replacement of the uterus. The cervical ring can be split from above through an abdominal incision, or from below either anteriorly or posteriorly. I have had two such cases where the replacement was made by incising the ring and uterus anteriorly. Both these women, one of whom had had chronic inversion for eleven years, made good recoveries.

It must be remembered also that if the woman does not die from hemorrhage or sepsis, she can live years with chronic inversion of the uterus. After the publication of my article in which were reported the two cases mentioned above, I had letters from quite a number of physicians citing cases they knew of where the accident had occurred ten, twenty or more years previously. Yet the women had lived in comparative comfort except for excessive hemorrhage at the menstrual periods.

Dr. Bartholomew: I might remark upon the fact that the laceration was repaired before the placenta was expressed. The manipulations in replacing this inverted fundus did not seem to make any difference with the repair and the union was as good after the tenth day as if the patient had not had the parts stretched as they must have been in this manipulation. I must confess that the discovery of this condition was entirely unexpected and unlooked for. It is infrequent enough so that one is not apt to be well posted on the findings and the treatment, especially when there are such misleading statements made in the books as to what should be done, and it is up to each one as a matter of fact to work out his own procedure, according to indications, when such

an emergency occurs. But with more frequent reports of the condition and more agreement upon what should be done, the statistics in regard to the deaths ought to improve.

DR. FREDERICK R. WALDRON: What would be done in case you find a transverse ridge? Would you use ergot?

DR. BARTHOLOMEW: I believe I would stop all manipulations whatever from above and would remove the placenta manually from below and at the same time stimulate with the hand inside until I felt the uterus contract down and when the hand is withdrawn give ergot to keep the uterus in tonic contraction.

LANTERN SLIDE REVIEW OF THE MONTH'S RADIOGRAMS.

JAMES G. VAN ZWALUWENBURG, M.D.
(From the Department of Roentgenology, University Hospital, Ann Arbor, Michigan).

The slides shown were as follows:

1. Four stages in the treatment of osteomyelitis of the tibia with regeneration.
2. Brain tumor.
3. Old surgical defect of the calvarium.
4. Two cases of atrophic arthritis of the shoulder.
5. Transverse fracture of the os magnum.
6. Three cases of primary hemorrhage in tuberculosis.
7. Lung syphilis.
8. Old and extensive tuberculosis of the lungs, with a provisional diagnosis of carcinoma glottidis.
9. Advanced tuberculosis of the lungs, accepted by two life insurance companies within the past year.
10. Epigastric hernia.
11. Situs transversus.
12. Twin pregnancy.

The cases listed under (6) are of unusual interest. These cases all originated in the University Health Service. In two, the hemorrhagic sputum was obtained and shown to contain tubercle bacilli in small numbers, while all subsequent examinations were negative. In the third case, the hemorrhagic sputum had been destroyed, but that obtained at a later slight hemorrhage gave similar findings. No symptoms suggestive of the disease were given previous to the hemorrhage, and apart from the signs due to the presence of fluid in the bronchi immediately after the hemorrhage, the physical examinations were negative. The stereoscopic roentgenograms also failed to disclose the pathology.

The explanation offered by the roentgenologist is that a small ulcerative lesion in or near the bifurcation and well within the normal hilus shadow has given rise to this unexpected hemorrhage. This area is not open to roentgen observation as is the rest of the lung because of the normal density in this region and the wide physiologic variation in the extent of this shadow. This is, of course, well known. It is not so commonly known that a small lesion in this area may go to ulceration and hemorrhage before microscopic lesions appear in the periphery of the lungs.

These cases emphasize the necessity of obtaining the *hemorrhagic sputum* for microscopic examination to make a diagnosis.

In connection with the case that had successfully passed two life insurance examinations in the past year (9), the comment was offered that we were all paying this man's premium. The system is manifestly unjust that obliges the good risk to pay a premium sufficient to cover the extra hazard of a risk such as that shown, when an adequate examination would have shown the presence of cavities in both uppers and extensive involvement throughout both lungs. A little publicity in the matter of the usual perfunctory insurance examination might be in the interest of the public.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, March 1, 1916

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

HISTOPATHOLOGIC STUDIES OF MULTIPLE SCLEROSIS.

(Lantern Slide Demonstration)

THEOPHIL KLINGMANN, M.D.
(From the Laboratory of the State Psychopathic Hospital)

The histopathology of multiple sclerosis has been carefully studied and described. Nevertheless the pathologic changes found in various elements of the nervous system have not been satisfactorily correlated. The material for the author's observations was obtained from the Michigan State Hospitals for the insane and was transferred to me by the director of the State Psychopathic Hospital, Dr. A. M. Barrett, to whom I am much indebted for this excellent opportunity. The clinical records of the cases, three in number, were made at the State Hospitals for the insane and which I will relate briefly as follows:

1. (309) A man of 54 years who was under observation at the Kalamazoo State Hospital for the insane for four years. The duration of the mental disorder was about nine years and the history indicates that definite neurologic signs existed for five years.

The neurologic examination is rather incomplete but it was noted that the patient had a marked tremor of the hands and almost continuous choreiform movements of the head, arms and hands. His station was unsteady with the eyes closed. The tendon reflexes were all increased and an ankle clonus was elicited on the right side. There was a marked speech defect and the patient spoke very slowly. Shortly before his death he developed bed sores.

The mental symptoms were very marked, consciousness was markedly clouded, the memory was poor and he developed delusions and hallucinations of sight and hearing. Later in the course of the disease he showed marked mental deterioration.

2. (302) A man 44 years old who was under observation at the Kalamazoo State Hospital for the insane for six weeks.

The duration of his mental disease was two years. While at the Kalamazoo State Hospital he had several paretic seizures of short duration involving the right side of the body. He complained of headache and nausea, shortly before his death, had a number of convulsions and died some hours after one of these attacks.

The patient was a very large and muscular man. He was unable to walk or stand. The left hand and arm were paralyzed. The right side of the face was immobile and the tongue deviated to the right. The speech was scanning and there was marked deafness in both ears. The sense of taste and smell was much impaired. The left forearm was rigidly held in flexion and there was marked atrophy of all the muscles of the left forearm and small muscles of the left hand. On the ulnar side of the left forearm tactile sense was lost. In the right hand there was a marked tremor occurring on volition. There was some muscular atrophy of the flexors and extensors of both legs.. All tendon reflexes were exaggerated. A Babinski toe reflex was present on both sides. The patient had incontinence of urine and feces.

Mental Examination: Consciousness was clear but the patient was disoriented for time and place. School knowledge was well retained, although the memory was defective and judgment impaired. The emotions were staple and there were no disturbances of will. The patient had auditory and visual hallucinations and delusions of persecution.

3. (412) A man 49 years old who was admitted to the Eastern Michigan Hospital for

the insane where he was under observation for three years, which marked the termination of the case.

He complained of lancinating pain in the back, joints, legs and at the exits of the sciatic nerves, and failing sight. During the first part of his illness he had an apoplectiform seizure and lost the use of his left arm and leg. He partially recovered the use of the left arm but not of the leg. He experienced several cerebral seizures consisting of coma, with consequent paralysis of the lower facial muscles of the left side. During these seizures there was an elevation of temperature varying between 102 and 103 degrees F. With each seizure the paralysis became more marked but remained localized. The reflexes, lost during the seizures, were increased at other times. There was an ankle clonus and Babinski toe reflex on the left side. In the left arm and leg there was considerable atrophy of the muscles. Light touch and pin point was more perceptible over the left side of the face, left arm and leg but otherwise there was no disturbance of cutaneous sensibility. There was a decubitus on each side of the buttocks. Three years later his right side became weak which was evident only in a general asthenia.. From the very beginning of

CLASSIFICATION ACCORDING TO LOCATION OF LESION

I. Spinal
- 1. Dorsal
- 2. Cervical
- 3. Lumbosacral
- 4. Sacral
- 5. Mixed

} Dorsal and mixed, most common.

II. Cerebral
- 1. Psychic
- 2. Hemiplegic
  - A. Form in which hemiplegia originates like apoplexy and may be residual.
  - B. More chronic cases in which hemiplegia is progressive.
- 3. Pseudobulbar—Common Type. At times hard to differentiate from cerebral arteriosclerosis.
- 4. Cortico-epileptic. Rare.
- 5. Tumor Type.
- 6. Pontine or Bulbar—With the especial forms of sclerotic encephalitis of pons and medulla.
- 7. Cerebellar.
- 8. Ocular.

III. Cerebrospinal. Classical form to which majority of cases belong.

IV. Miscellaneous According to Symptoms.
- 1. Benign form.
- 2. Rare form with remissions lasting ten years +.
- 3. Latent cases with slight clinical signs and symptoms.
- 4. Familial Form. Question whether this form occurs.
- 5. With Pain
  - A. Sclerosis multiplex dolorosa with trifacial neuralgia, etc.
  - B. Apoplectiform attacks with unilateral paresthesia and pain.
  - C. Headache.
- 6. Vasomotor. Rare.
- 7. Oculopupillary. Unilateral narrowing of pupil and palpebral fissure.
- 8. Disturbances of body temperature.

PLATE I.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

PLATE II.

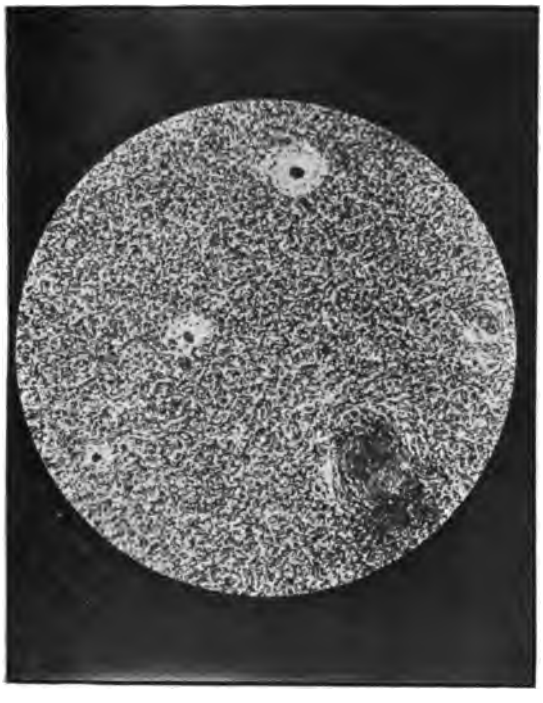
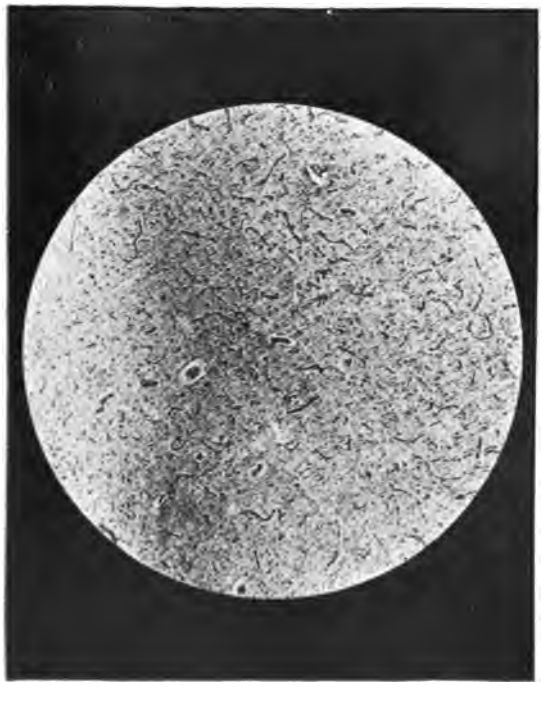


Fig. 5.

Fig. 6.



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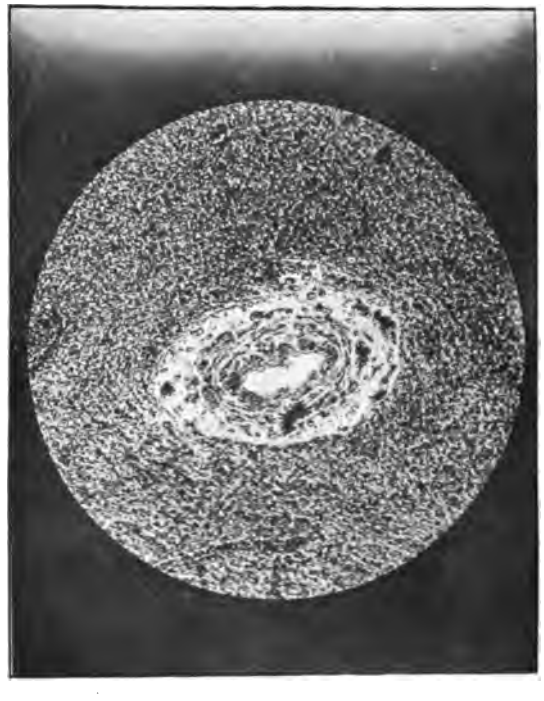


Fig. 8.

PLATE III.

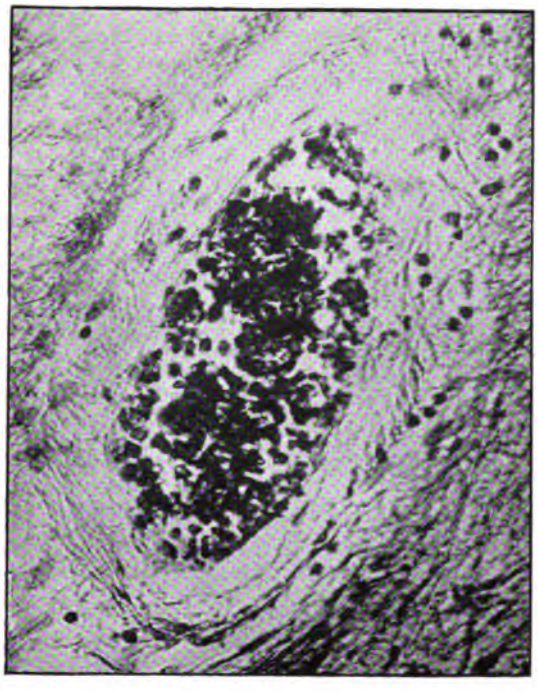
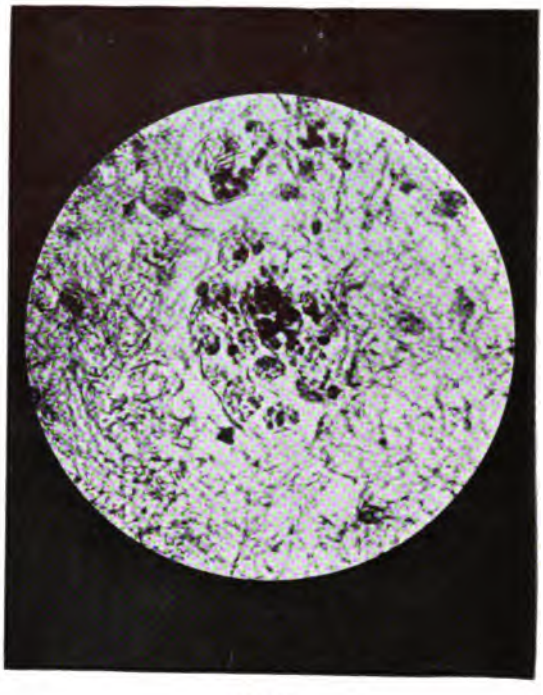


Fig. 9.



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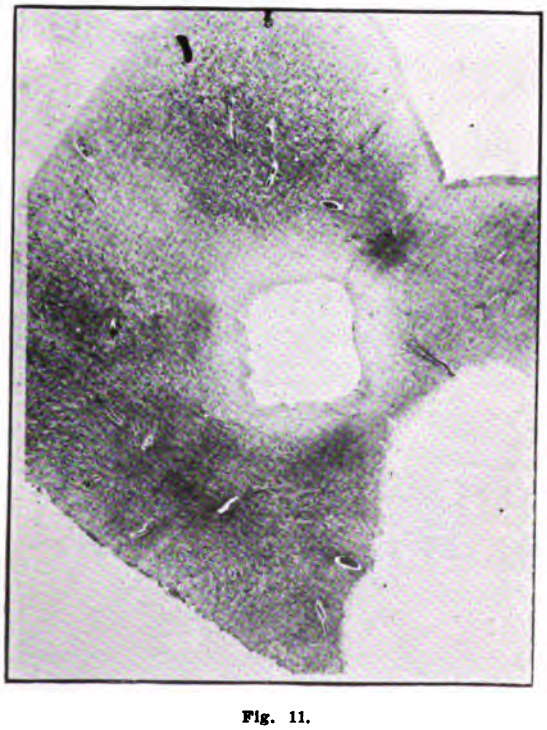

Fig. 11.

Fig. 12.

PLATE IV.

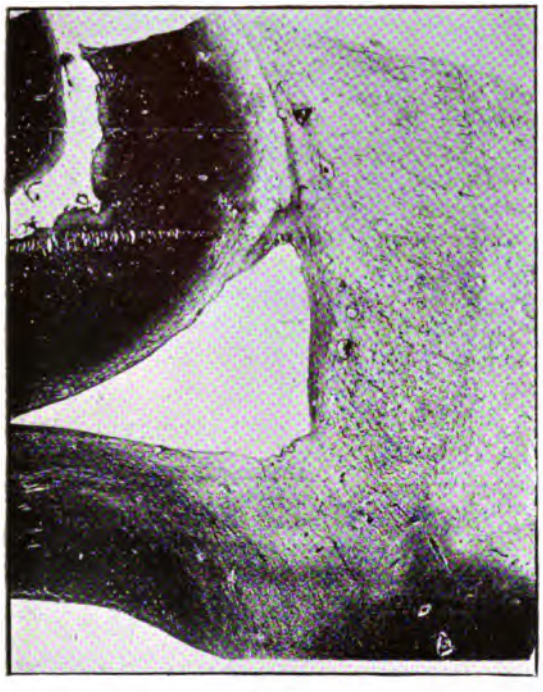

Fig. 13.

Fig. 14.

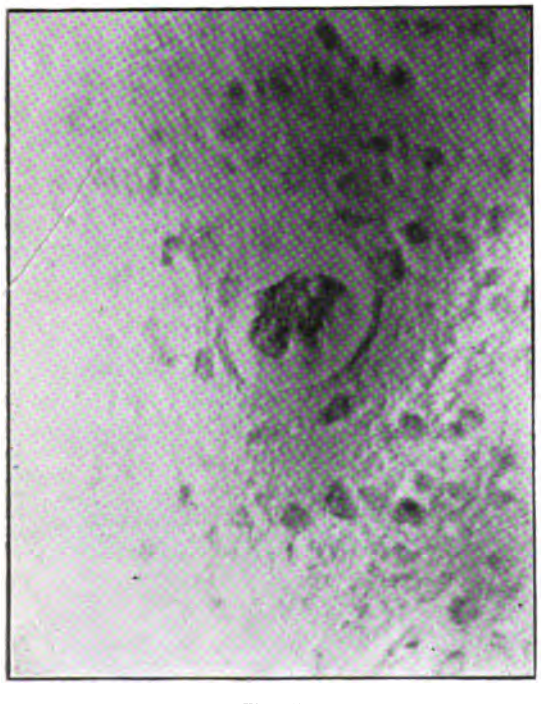

Fig. 15.

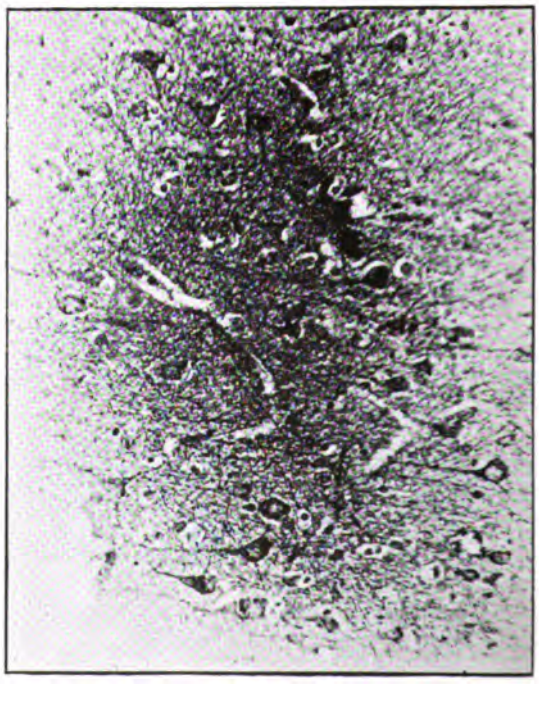

Fig. 16.

of the disease there was pronounced ataxia of the fingers of both hands, gradually extending to the arms and finally involving the legs. There was a marked intention tremor of both hands. The speech was scanning.

Mental symptoms appeared in the last year of his illness which consisted of emotional instability and marked optimism with reference to disease. The slightest provocation caused pronounced irritability, at other times involuntary outbursts of laughter. The judgment was defective and the facial expression was silly with a broad grin over the face most of the time. The ophthalmoscopic examination revealed nothing abnormal although the vision was poor. The cerebrospinal fluid was normal.

The autopsy findings were not unusual and I will therefore not review them at this time. However, it is of interest to note that in two of the cases pulmonary tuberculosis and in one, glandular tuberculosis was found at the autopsy.

For a brief review of the various forms of multiple sclerosis and the distribution of the lesions I offer the following classification:

CLASSIFICATION ACCORDING TO CLINICAL FORMS

1. Acute..
2. Subacute.
3. Chronic.
4. Remittent.
5. Chronic Progressive with remissions and exacerbations. Remissions may last ten years.

EXPLANATION OF PLATE I.

Fig. 1. A horizontal section of a blood vessel in the region of the posterior horn of the left lateral ventricle showing a marked exudate into the vessel wall and the perivascular space. The cellular elements are mostly mononuclear leucocytes. There are also red blood cells and along the center of the vessel wall may be seen numerous plasma cells. Bordering the perivascular space is a layer of rather large and irregular neuroglia cells. The surrounding tissue shows a marked neuroglia proliferation. (Van Gieson stain).

Fig. 2. An oblique cross section of a vessel in the region of the left optic radiation showing large irregular spaces between the trabeculi of the tissue of the vessel wall in which are seen a few mononuclear cells. Surrounding the vessel there is a dense felt-work of neuroglia fibers. At one side and at each end of the section of the vessel the neuroglia proliferation has obliterated the perivascular space and has invaded the vessel wall. (Phosphotungstic acid hemotoxylin stain).

Fig. 3. A section from the caudate nucleus showing a marked perivascular gliosis with but a remnant of the vessel wall remaining in the center. (Phosphotungstic acid hemotoxylin stain).

Fig. 4. A cross section of the lenticular nucleus. A silver preparation according to Bielschowsky showing a marked divestiture of neurofibrils in the region of the plaques. In the center of each plaque an occluded blood vessel is plainly seen.

EXPLANATION OF PLATE II.

Fig. 5. A section of the white substance near the subcortical margin showing a number of homogeneous plaques; in the center of each are red blood cells. At the lower margin of the section is a circumscribed area of gliosis in which the neuroglia fibers are easily differentiated and in the center of this area is a blood vessel. (Van Gieson stain).

Fig. 6. A section of the cortex showing an almost structureless area in the center of which are remnants of a degenerated blood vessel. The tissue surrounding this area consists largely of neuroglia fibers. (Van Gieson stain).

Fig. 7. A silver preparation of the cortex according to Bielschowsky's method showing a marked increase in blood vessels and strikingly few neurofibrils.

Fig. 8. A blood vessel under high magnification showing a marked granular condition of the endothelium bordering the lumen. The vessel wall contains irregular spaces in which are found cells of mesodermal and ectodermal origin. The irregular dark bodies in the vessel wall and in the perivascular space are phagocytic neuroglia cells filled with fat. (Herxheimer stain).

EXPLANATION OF PLATE III.

Fig. 9. A large vessel from the periventricular region showing a marked perivascular gliosis. The vessel is surrounded by numerous neuroglia cells. The vessel wall is impregnated and almost obliterated by neuroglia fibers. There is no perivascular space. (Phosphotungstic acid hemotoxylin stain).

Fig. 10. A blood vessel from the cortex showing phagocytic neuroglia cells in the meshes of the vessel wall. (Phosphotungstic acid hemotoxylin stain).

Fig. 11. A cross section of the aqueduct of Sylvius, showing a granular ependymitis.

Fig. 12. A portion of the section of the aqueduct under higher magnification showing

a marked neuroglia proliferation causing irregular elevation in the lumen. (Phosphotungstic acid hemotoxylin stain).

EXPLANATION OF PLATE IV.

Fig. 13. The tissue surrounding the posterior horn of the left lateral ventricle shows numerous degenerated neurofibrils. They appear as very tortuous spirals as can be readily seen in the margin of the section. They are not unlike the spirochete found in the paretic brain; in the silver preparation as this is, they stand out much more prominent than the normal nerve fibers.

Fig. 14. Two thrombosed vessels with marked perivascular gliosis.

Fig. 15. A section from the cortex showing the formation of a plaque and the irregular arrangement of the nerve cells as well as changes in the form of the cells. (Nissl stain).

Fig. 16. A section of the cortex showing a marked divestiture surrounding a sharply circumscribed well preserved cortical area. (Bielschowsky's method).

The illustrations lead to the conclusion that there is an inflammation with a marked exudate into the vessel walls and into the perivascular spaces. A reaction in the myelin sheaths and in the neuroglia as well as the mesodermal connective tissue is very apparent.

DISCUSSION.

Dr. Albert M. Barrett: I am very much interested in this work of Dr. Klingmann. It seems strange that a disease so common as multiple sclerosis, one of the most common of all nervous diseases, should have so obscure a pathology. We have known for a long time the gross appearances of the lesions and the clinical symptoms, but the origin of the process still remains obscure. It has for a long time been thought that the only way one could account for the irregular distribution was by a vascular origin. Dr. Klingmann has very well shown the intimate relations which vessels bear to the distribution of these processes. Unfortunately it seems that the acute changes which one really wants to know about in these conditions seem not to have been studied, probably on account of the lack of material. One finds in most cases of multiple sclerosis all kinds of stages of a process. Most of the cases one sees rarely die in the acute stages of the disease so one has the mere clinical and secondary reactions to study. One cannot speak too highly of efforts to solve this question, because it still remains a disease which is very obscure in its pathology.

As far as the gliosis is concerned, it is a question of secondary reaction. The primary cause is to be sought in some factor, possibly toxic, distributed through the vessel spaces and lymph sinuses which disintegrates the myelin around the vessels and then one gets the neuroglia. And evidently one gets at the same time the inflammatory reactions which Dr. Klingmann has shown.

Dr. Carl D. Camp: This condition is certainly more common than is generally recognized by the profession and deserves very careful study. I have been especially interested in the way in which changes in the symptomatology can occur. When we see these cases post mortem it is difficult to realize that these sclerotic areas, so-called, cannot be permanent. When we see the cases clinically we see the symptoms, such as loss of reflexes, appear and disappear. The symptoms are so transient that it seems necessary that we think of a cause which at times acts and at other times ceases to act.

Dr. Udo J. Wile: I should like to enquire about the fat cells around the blood vessels and to ask Dr. Klingmann if this change is in the nature of a fatty degeneration or whether the fat is carried there as a foreign body. There is an analogy in certain changes that one meets in general pathology where circulating lipoid is deposited in the endothelium of the blood vessels and produces changes there that react upon the connective tissue and give rise to a fibrosis, which resembles the process which Dr. Klingmann describes.

Dr. Klingmann: I might add that all of these patients had tuberculosis. Two had pulmonary tuberculosis and the other had a glandular involvement.

In regard to the variations of the symptoms, attention has been called to the fact that there is an increased amount of lymph and we notice in sections of tissue of sclerosis that the lymph spaces are all very wide. Whether that is really due to pressure, to an edema, or whether to a certain extent they are due to artefacts, I am not in a position to say. Writers have called attention to the fact that it is possibly due to localized changes which are not permanent.

In regard to Dr. Wile's question, I may say that the fat is collected in the cells and as far as I could make out most of these cells were the scavenger neuroglia. Besides these cells there were numerous epithelial cells which did not contain fat. It seems to be rather difficult where the cells are filled with fat as these were, to tell what the nature of the cells is, but comparing these sections with other sections not treated with the Herxheimer stain, it appears that they are probably the neuroglia scavenger cells. In all probability the collection of fat comes from the breaking down of the myelin sheaths and the degeneration of the nerve fibers themselves.

Attention has been repeatedly called to the association of tuberculosis with multiple sclerosis. Many cases have shown clinically lesions of the lungs. It would be very interesting to follow this up in all the cases. The reason that we are obliged to study chronic conditions, or the terminal stage of the disease is because the patients do not die early from multiple sclerosis. Therefore it is very difficult to study the beginning of the disease, or the condition in acute stages. There are very few cases where this is possible.

SOME REMARKS AND CLINICAL REPORTS ON THE USE OF DAKIN'S SOLUTION.

C. B. G. DE NANCREDE, M.D.
AND
R. W. KRAFT, M.D.
(From the Surgical Clinic, University Hospital, Ann Arbor, Michigan)

At the request of your President, I have consented to make a few remarks concerning an alleged new remedy for infected wounds, which is claimed to produce results not much short of marvellous. Fortunately we have but few cases where, asepsis going astray, or because of the necessity of invading tissues recently the habitat of pyogenic organisms, inhibitory influences being removed from the microbes, profuse suppuration occurs. Dr. Kraft has kindly supplied me with brief notes of the few cases where we have had a chance to try this much vaunted remedy.

But first a few words must be devoted to an attempt to disentangle fact from fancy, concerning this Carrel-Dakin solution as it is most commonly termed. I say an attempt, because I am far from certain that the abstracts from which I draw my information are correct. Certainly the percentages of the hypochlorous acid, and some other ingredients markedly differ, yet I do not regard these discrepancies as of serious moment.

Hypochlorous acid is said to have been first discovered by Berthollet in 1788, but Ballard in 1834 seems to have later shown that Berthollet's fluid really consisted of sodium chloride and sodium hypochlorite. Perry by passing chlorine into crude potashes in 1792 secured a disinfecting fluid called *Eau de Javal,* because made at the Javal works near Paris, really a solution probably of impure sodium hypochlorites. The French pharmacist, Labarraque by passing chlorine through an aqueous solution of sodium carbonate, obtained a fluid containing much free alkali, hence irritating. Later, by other processes, a more stable preparation than the hypochlorites of sodium and potassium was secured and is what is probably usually termed Labarraque's solution, viz., one of calcium chloride and calcium hypochlorite. This is the preparation by means of which Semmelweiss in 1846 eradicated puerperal fever from his clinic. In addition to these brief statements, let me add that several elaborate methods have been described for preparing this Carrel-Dakin solution, but all non-essentials being neglected, such as salts of boracic acid, the active agent is from 2-3.5 per cent. of hypochlorous acid. The formula we have employed is as follows: Dissolve grams 12.5 grains chlorinated lime in 1000 cubic centimeters of water, after which 12.5 grams of acid boricum is added; then leave this standing for twenty-four hours, filter and use.

The use of Labarraque's original solution for sloughing carcinomata was taught me nearly fifty years ago, but I have only of late employed anything of this kind for recent infected wounds.

I would premise Dr. Kraft's brief notes of the few cases in which this remedy has been employed by saying that the alkalinity of true Labarraque's solution, which is decidedly irritating, is removed by the addition of the boric acid, which in itself is probably of little value. Some of the benefit in unhealthy wounds is believed by certain of the Continental surgeons to be due to the increased vascularity resulting from the mildly irritant effects of the application, and not to the germicidal effects of the hypochlorous acid. Indeed some recent reports claim that the wound fluids thus treated provide a favorable culture medium for germs.

I am reasonably satisfied that for a time nothing but good results, but believe that the granulations tend to become pale and avascular. As is to be expected, the odor is improved, and in the seriously infected sloughing wounds which as a rule follow shell wounds, I should expect exceptionally good results. It cannot be ignored, however, that free drainage, mechanical removal of hopelessly damaged tissues, and the statement that free "debridement" is commonly employed, must be given due weight in considering the results. Per contra, even the following cutting makes us skeptical concerning many statements coming from abroad through the medical press. So many conflicting statements, which are often diametrically opposed reach us, that we cannot but demand time to correct such apparently ill-founded claims as every new periodical brings.

Dr. Tuffier at a recent meeting of the *Societé de Chirurgie de Paris,* advised the systematic introduction into seton wounds of a gauze drain for irrigation and disinfection by Dakin's fluid. Dr. Broca showed, by personal statistics, that more than three-fourths of these seton wounds healed without other treatment than application of aseptic dressings at the orifices.

Continual irrigation with Dakin's fluid, therefore, has no advantage in such cases; on the contrary, it has disadvantages, for in seton wounds which contain debris of clothing, with or without bone fragments, Tuffier himself admits that irrigation with Dakin's fluid is in-

efficacious. In these cases the only course to pursue is to open up freely on the appearance of the first signs of inflammation.

I think that I have never seen under the free use of boracic acid solution, the rapidity with which the pus is diminished, with the Dakin's solution. I think we have long since found out by laboratory experiments, and clinical experience that boracic acid is practically not much better than salt solution. As to the hyper- or hypo-tonicity, I know nothing. This has never been mentioned in the accounts I have read. Some of the solutions are 3½ per cent.. some 2 per cent., and some I don't know what per cent. I must say that I think this solution has a marked effect in diminishing pus and odor. All of these reports of the wonderful effect in wounds, as I have said, were for seriously lacerated, infected wounds, with advanced mixed infections. These were freely laid open to get perfect exposure, and the scissors and knife were used to trim away hopelessly damaged tissues. The deepest portions were drained by tube in most cases, and then light packing with gauze, soaked in this solution was placed, and maintained in contact with the surfaces.

Here in the quotation of the two Parisian surgeons, note that one claims that gauze soaked with this solution, should be passed even through seton wounds, and the other says that you need only put on an aseptic dressing at the exit and entrance wounds and that three-fourths will get well equally certainly without complications, in other words, the uninfected wounds. On the other hand, as Broca shows, more harm than good follows the more radical practice really indicated only for the seriously infected ones. There can be no one method of treating every war injury.

In the few case-notes with which Dr. Kraft has supplied me, it cannot fail to be recognized that not one was a sloughing wound with large masses of devitalized tissue, and fragments of infected clothing, soft parts, or some foreign body. Therefore, the results I shall mention, in no wise prove that with the worst conditions presented, even the moderate improvements that I have secured, would have been noticed.

I am personally very skeptical as to the part played by chemicals in wound treatment, but it does seem to me from what I have personally seen of shell wounds, and because for the first twenty-five years of my practice I never saw even an operation wound heal without suppuration, I must concede that this solution has some effect. It is not irritating. I have very grave doubts whether the major part of the improvement is not due to the free exposure of the damaged surfaces required by the method of applying the remedy advised by most, which provides the freest exit for discharges and damaged tissues. Thus in infected wounds with much destruction of tissue, I again repeat that the results secured must be very largely due to the free drainage, and the ready exit for dying tissues.

None of the cases which I shall mention, were in any sense similar to those resulting from extensive shell and bullet wounds, with the worst results of marked infection. Because some benefit accrued from our treatment of these comparatively trivial injuries, there is no proof that the marked effects claimed in the worst class of cases is to any extent proved.

Case 1. C. T. age 3, explored for needle in knee by Dr. Darling.. A stitch abscess occurred at the upper angle of the wound. Temperature 102.4°, due as was shown to staphylococcus infection. Sutures were removed and the wound irrigated for seven days with Dakin's solution, no drainage. Healed at the end of ten days, the pus markedly lessening after the first treatment. Very little scar formation. Knee joint normal.

Case 2. Mr. C. D. age 37. Operated by Dr. Barss. Twelve hours following operation for inguinal hernia the temperature reached 103° and the white cell count 29,000. A large swelling formed on the second day in the flank, and on aspiration a large amount of serosanguineous fluid, showing short chain streptococci was secured. The discharge soon became purulent and very profuse. Leucocyte count 19,500. The patient was very ill. The sutures were removed and a tube introduced on the fifth day. The abscess in the flank drained through this, but a counter opening had to be made at the most dependent point on the twentieth day, when Dakin's solution was first used. The tube was out by the thirtieth day, and ten days later the patient was discharged with an entirely healed wound. This infection was a virulent one, the patient being very ill, restless and sleepless. The pus was lessened by one-half after the first irrigation with the solution, but a counter drain was inserted on the same day.

Case 3. Mrs. B. age 28. Appendix removed during an interval. Twenty-eight hours after the operation the temperature reached 102° leucocyte count was 40,000, reaching 50,000 on the third day with temperature 103°,

pulse 138. The seventh day, the temperature was 104.9°. On the twelfth day temperature was 104.9°, pulse 120. On the sixth day three stitches were removed, and the next day a tube drain was introduced, and another tube on the twelfth day. Irrigation was started on the seventh day, when the discharge immediately became slight, and in ten days after the institution of treatment, the white cell count dropped from 50,000 to 9,500. On the twenty-sixth day the patient was discharged with the wound entirely healed. Her temperature had dropped from 104.8° to 98.6° by the third day after the use of Dakin's solution. The apparent cause of the trouble was a very marked erysipelatous lymphangitis of the right mammary gland, and axillary lymph nodes which was evidently bloodborne.. The only portion of the wound which was infected was the subcutaneous fat which was very thick. It was believed also to be bloodborne infection as there was no spread of the breast infection to the abdominal incision by continuity.

Case 4. M. G. age 19, amputation at hip joint for sarcoma of the femur for which a conservative operation had been done two months before by Dr. Darling.. Consequently, from this considerable lingering infection in the bone and soft parts of the thigh occurred, which apparently cleared up before the patient came under my care. Operating thus, in tissues previously infected, a tube drain of large size was of necessity employed, and on the eighth day, the discharge became not only free, but purulent. Irrigation through the tube, and dressings of the wound with the Dakin solution, seemed to very promptly diminish the discharge, and improve its character, but it was still markedly purulent, although steadily diminishing. On the thirty-third day after operation, the patient was sitting up in a wheel chair, and was sent home on the fifty-eighth day.

Case 5. Mr. McA. 52 years of age, had had for years recurring suppuration of the soft parts of the thigh the results of extensive disease of the knee joint. While it seemed as if the flaps had been cut well above the old suppurating areas, within forty-eight hours he had a high temperature, pulse, and profuse suppuration. This became markedly diminished with the use of Dakin's solution, despite the fact that implication of both shoulder joints by an embolic process, and other pyemic foci caused his death. The amputation wound was practically healed, although it seemed at the outset to bid fair to remain open for many weeks.

The explanation, except in the last two cases, of the failure of asepsis, is not necessary to discuss for our present purposes. I cannot but believe that a decided benefit accrued from this treatment over and above that which we secured by mechanical conditions of the wound by efficient drainage. I cannot but think that if these had been wounds with a severe mixed infection, containing devitalized tissues such as often obtains in war wounds, the results would have been far less satisfactory than in the comparatively trivial conditions presented by the cases.

DISCUSSION.

Dr. Ira D. Loree: Dr. de Nancrède recommended my trying this solution in a case of residual abscess from seepage of urine from a kidney which we had opened. The infection readily cleared up after opening, so we haven't used the solution. Dr. de Nancrède's cases I take it are nearly all acute. I would like to know of what value this would be in chronic cases like some of the cases of appendicitis we used to have. Formerly when we had a case of appendicitis to operate here it was always suppurative. If it was a localized abscess we thought we were unusually lucky. There was usually peritonitis in the early days. Some of these wounds remained open for weeks. Dr. de Nancrède insisted that those cases had to be irrigated twice a day. We had to come over and irrigate them at night. If this is a good thing for chronic suppuration I think we have two or three cases in the Genito-urinary Clinic upon which we can try it. One man I am sure it can not harm, an old man in the 70's who came to the Hospital passing fecal matter per urethram. He had four or five calculi in the bladder which we removed hoping that this drainage might cause the fistula to close. He has a very foul bladder and the wound is suppurating and sloughing and I would like to ask Dr. de Nancrède's advice as to whether we should try some of this solution.

Dr. de Nancrede: As you have remarked it can do him no harm.

Dr. Walter A. Hoyt: I have been very interested in following out some of these cases and especially in the hip joint amputation where we had quite a discharge. The first twenty-four hour dressing was completely saturated through several thicknesses of gauze and pads and external dressings. At that time we put in a tube to drain the discharge but we had it in several days before we tried the solution. Undoubtedly there was a rapid decrease in the amount of discharge, I would say in four or five days at least half the amount, and a rather rapid decrease from then on. In this case in particular before we began using this solution the granulation tissue about the opening was very red and vascular. After using the solution for a short time the granulations seemed to stop their prolific growth and become more or less smooth and pale. It seems to me that in these cases as soon as the discharge has let up to a certain extent it is a good plan to

stop the irrigation because the granulation of tissues comes to a standstill. In all of these cases we used drainage and undoubtedly that is one of the important parts of the treatment. It is not unpleasant to the patient and is not irritating. It doesn't hurt the patient to have the wound irrigated and they don't object to it at all. It seems to me it is a good solution provided there is the proper amount of drainage established early, and I would say that it should be discontinued early rather than carry it through the whole infection.

Dr. James A. Van Zwaluwenburg: I should like to ask about the tonicity of this solution: is it hypotonic or hypertonic? It occurs to me that both boracic acid and hypochlorous acid are relatively poorly dissociated, and the solution used might be nearly isotonic.

Dr. R. U. Kraft: About a 2 per cent. solution.

Dr. Van Zwaluwenburg: That is about an isotonic solution.

A CASE OF PSEUDOHYPERTROPHIC MUSCULAR DYSTROPHY

Carl D. Camp, M.D.

(From the Clinic of Neurology, University Hospital, Ann Arbor, Michigan)

The patient was ten years old and was brought to the Hospital on account of inability to walk. The case presents some unsual features: First, there is no family history of the disease. The father and mother were both well and the Wassermann reaction was negative on the blood of each of them. The patient had no brothers or sisters living. One was killed accidentally but had shown no similar disability and there was no history of the trouble in grandparents, uncles or aunts. The patient's history was obtained from the parents. He weighed twelve pounds when born but "cried continually" for the first two years. He had no jaundice, no skin eruption and no convulsions. He walked at one and a half years and talked when one year old. His mental development appeared to be normal. He walked fairly well until six years old, but at all times his body would sway in walking and he never could run. He began to go to school but had to stop on account of the difficulty in walking. From the time he was six years old his difficulty in walking gradually increased until he reached his present condition of absolute inability to stand or walk, which was three months before he was brought to the Hospital. There was no pain at any time.

Examination of the patient showed a normal mentality for his age. He was unable to stand or walk. There was no adenopathy. The spine showed a slight lumbar lordosis. The pupils were equal, and reacted to light and in accommodation. There was no extraocular palsy. There was no paralysis of the face or tongue. There was no definite nor localized paralysis in the upper or lower extremities. There was marked weakness, however, in the movements of the shoulder and in the legs. There was marked atrophy of the shoulder girdle muscles and also of the arms but no atrophy of the forearm or hand. The thighs were small and appeared especially so in contrast with the large, hypertrophied calf muscles on both sides. The weakness in the erector spinae muscles is shown by a sitting position. The tendon reflexes in the upper extremities were present. The knee reflexes were not obtained but the Achilles jerks were present. Sensations to touch and to pinpoint were normal in all the extremities. The ocular fundi were examined by Dr. Parker and reported normal. Special note was made of certain of the so-called stigmata of hereditary syphilis. The patient has marked scaphoid scapulae; the bridge of the nose is very wide and somewhat depressed; there is a Mongoloid flap at the inner canthus on both eyes; and the superficial veins in the temporal region and in the head are very well seen. The patient has only four of his second set of teeth; these are the lower incisors and are notched. There is no atrophy of the thyroid gland. The points of special interest about the case, in addition to the negative family history, are: the advanced stage of the disease, a history of some peculiarity in gait ever since birth, and, finally, the presence of some of the stigmata, so called, of hereditary lues, although the Wassermann reactions on his blood and spinal fluid were negative.

In 1913 I published a paper on hereditary degeneration (*American Journal of the Medical Sciences*, 1913) and my conclusion in this paper was that in these cases we were dealing not with a hereditary characteristic which could be transmitted as a unit character in the Mendelian sense, but that we were dealing with some factor such as a toxin which caused degenerative changes in various tissues, sometimes in muscles, sometimes in bones, sometimes in the central nervous system.. This degenerative factor is transmitted and then causes similar degenerative changes in the offspring, and that it is a degenerative factor which is transmitted is shown by the fact that we do not get degeneration which is exactly alike but is of one kind in one parent and of another type in the child.

A CASE OF LEUKEMIA WITHOUT HYPERLEUCOCYTOSIS.

QUINTER O. GILBERT, M.D.
(From the Clinic of Internal Medicine, University Hospital, Ann Arbor, Michigan)

In certain respects the present classification of leukemia is unsatisfactory. While the chronic lymphatic and chronic myelogenous types represent fairly characteristic diseases, relatively little is known of the acute forms and of those forms in which changes of a leukemic character are present in the blood forming organs, without the characteristic blood changes of leukemia. It is known that these unusual conditions can occur in the usual forms of leukemia as a result of treatment by Roentgen rays or by benzol and that they may develop spontaneously in such patients or after infections such as tuberculosis, pneumonia and syphilis. It seems likely, however, that in certain cases the leucocyte blood count remains low despite the presence of typical leukemic changes in the blood forming organs.

In most of such cases, however, the nature of the disease is still evident from the changes in the differential count of the white cells, and the diagnosis can often be made from the blood alone, despite the lack of a marked increase in the number of the leucocytes. The observations on the following case are reported with the view of contributing to the knowledge of these unusual cases.

A young man, age 18, a resident of Michigan, entered the Medical Clinic on February 4, 1916. The chief complaint was weakness and pallor. The family history was unimportant. As a child the patient had had measles, chickenpox and whooping cough without complications. There was a definite history of frequent attacks of tonsillitis and quinsy. About one year ago he had an attack called mumps. He has not been well since. During March and April, 1915, there were several attacks characterized by redness and tenderness of the joints with migration from one joint to another. . These attacks usually lasted a few days only and at different times all extremities were involved. The last of these attacks was in January, 1916. He gave up work in July, 1915. At that time he had a confining illness of three weeks with fever and severe night sweats. Following this sickness he was weak and pale and has not improved since. In November, 1915, the tonsils were lanced during an acute attack. For the last two months there has been some edema of the feet and ankles. There has been no definite history of hemorrhage. The loss of weight has been about ten pounds.

Examination.—On entrance the temperature, pulse and respirations were 103-100-22.. The patient is of fair size for his age. There is the general appearance of emaciation with subcutaneous edema. There is a marked pallor of the skin and mucous membrane. The face appears bloated. There is no edema of the ankles. Pupils and movements of the eyes are normal. There is a diffuse alopecia of the scalp. Pubic and axillary hairs are rather undeveloped. The lips are dry and cracked. There is a slight pyorrhea. The tongue has a heavy brownish coat and there is a petechial rash of the hard palate and exudates over the anterior pillars, pharynx and uvula. The tonsils are much enlarged and show scars of operative trauma. The glands of the anterior and cervical triangles are definitely palpable. The left posterior auricular and the suboccipital glands are palpable. The epitrochlears and axillary glands are about the size of small peas. The thyroid is slightly enlarged. Just above the umbilicus there is a small subcutaneous nodule. The examination of the lungs is negative. The heart has an increased rate and a faint, not transmitted, systolic murmur. The abdomen is not distended although there is marked tympany throughout. The spleen is palpable three finger breadths below the rib margin. The liver is not palpable. There are a few purpuric spots on the right side of the neck and legs and evidence of fading spots elsewhere.

The X-ray examination of the chest by Dr. Van Zwaluwenburg is negative except for evidence of slight passive congestion. The stools, sputum, blood pressure and Wassermann were negative. The patient remained in the Hospital for eight days. During that time there was a constant irregular fever ranging between 90 and 104° with a corresponding acceleration of the pulse. The patient during this stay became progressively weaker. He lost eight pounds in weight and showed an increase of the fever. During the last few days there was a definite tendency to hemorrhage about the lips.

The blood showed the most marked and interesting changes.. Enumeration of the blood cells were as follows:

	R. B. C.	W. B. C.	Hemoglobin (Helliges)
2-4-16	2,140,000	9,850	33%
2-9-16	1,590,000	10,700	27%
2-12-16	1,140,000	3,600	25%

The differential count of the white blood cells was as follows:

	N. poly.	Eos. poly.	L. L.	S. L.	Tra.	L. M.	Mast	Myelocytes	Normoblasts	Megaloblasts	Deg.
2-4-16	9.2%	0	72%	8.8%	0.4%	9.2%	0.4%	2	1	4	66
2-9-16	8.6%	0.6%	69%	15.2%	0	7.0%	0.6%	1	1	0	33
2-12-16	9.5%	0	62.5%	22.5%	1.5%	4.0%	0	2	1	1	12

The marked thing about the total counts is the rapidly progressive anemia. The differential count shows an increased percentage of the lymphocytic cells and an absolute decrease in the polymorphonuclear neutrophiles and eosinophiles. The platelets were almost entirely absent from all smears. The cells classed as lymphocytes were abnormal in several respects. They were mostly large cells equal to or larger than polymorphonuclears. The nucleus occupied practically the entire cell. In fact some of the cells showed but very little of a cytoplasm border. In addition the entire cell substance showed more than the normal affinity for the basic stains. But the striking observation was the very large proportion of these cells which showed stages of fission not only of the nucleus but of the entire cell. In the division cells observed in this patient, however, the divisions were evidently amitotic in character.

Dividing cells in the peripheral blood are rare and are usually due to mitotic divisions. These occur especially in megaloblasts and myelocytes.

Normal lymphocytes usually show a definite achromatic ring around the nucleus when stained with Wright's stain. Most of the cells of this patient did not show this characteristic. Except by the comparison of the staining reactions of other stains especially the Ehrlich-Pappenheim triacid, one could not always be sure whether the small cells conformed to the usual description of normal small lymphocytes. For this reason all the cells classed as large and small lymphocytes should really be classed as one group. The mononuclear cells in this blood did not give the oxydase reaction of Schultze, neither did they show the premature granules of myeloblasts nor any transitional forms from myeloblasts to myelocytes. This is evidence that they are not of myeloid origin. The polymorphonuclear cells stained poorly. The granules were large and coarse. These cells were definitely deficient in some of the normal staining substances.

The red blood cells showed marked changes in size and shape with a very definite tendency to the microcytic types. The cells showed the usual staining reactions present in severe secondary anemias. It was difficult to recognize the few nucleated red forms when stained with Wright's stain as the cytoplasm as well as the nucleus took the basic stain and the resemblance to small lymphocytes was marked. However, with the triacid stain these cells were very distinctly differentiated by reason of the dark bluish-green nucleus and reddish blue cytoplasm while the lymphocyte nucleus is usually stained with lighter shades of green, and the cytoplasm a pale homogeneous pink.

The bleeding time as determined by Duke's method was definitely lengthened, probably on account of the marked decrease of platelets.

A gland about the size of a lima bean was removed from the occipital region by Dr. Hoyt, and Dr. Warthin's pathologic report is as follows: "Lymphocytoma, infiltrating the capsule of the gland and surrounding tissues. Either an aleukemic lymphocytoma or a lymphosarcoma of the generalized variety." Many of the gland tumor cells are not unlike the cells found in the peripheral blood except that they are smaller due in part to contraction of the fixing fluids.

A number of similar atypical cases have been reported in the literature. Since they are not well understood, a variety of names have been suggested for them such as leukemia, aleukemic leukemia and mixed leukemias and aplastic leukemia.

Many of the cells of this case might well be classed as tumor cells, because of the general type of reversion to a younger type of cell, because of an unusual cell activity as shown by the division forms and because of some evidence

of possible origin in glands having the characteristics of malignant tumors. The cell division forms may be considered as evidence of a very unusual cell activity.

At present the difficulty in this type of case is that we do not know the true pathologic nature and etiology. On the one hand they are described from the pathologic viewpoint as true tumors, lymphoblastomata, with the lymphoblast as the parent cell. While on the other hand many of these cases, especially the acute forms in young individuals give a clinical history suggesting infections, and various organisms have been isolated from such patients.

This patient presents both sides of this disputed point. He has a clinical history of an unproved acute infection while he has evidence of a disease distinctly lymphoblastic in nature with the abnormal glands, gland cells and cells in the peripheral blood which might well be interpreted as neoplasm cells.

DISCUSSION.

Dr. Harry B. Schmidt: Dr. Gilbert has covered the ground very thoroughly. I should like to call attention to what he has already stated, that Dr. Dock has definitely shown that in cases with true lymphatic leukemia during an intercurrent infection, the cells can drop down to normal or below normal. I think we might drop the name of aleukemic leukemia and call them cases of leukemia with an intercurrent infection. When one finds an infection producing a blood picture of leukemia, one can usually tell the difference from leukemia. Dr. Cabot reported a number of cases a few years ago of white counts over a hundred thousand. Every one of these cases that showed these lymphatic variations in infections are not leukemias, and always have the small lymphocytes increased and not the large ones. Whereas in leukemia it is the large ones, or both. I saw a case of suppurative peritonitis in Dr. Peterson's clinic, with a white count of over 75,000 with an increase of myelocytes. We have had many such cases with nothing but neutrophilic myelocytes. At autopsy they always find some cause for it, such as a tumor in the bone marrow or miliary tuberculosis.

Dr. Mark Marshall: I am very much interested in the abnormal types of cells which Dr. Gilbert has just drawn showing the active division forms suggesting the tumor-like nature of the process. I think there is no doubt but that the chronic leukemias are tumor-like processes. However, the acute leukemias such as have been reported are for the most part severe infections. I cannot agree with Dr. Schmidt that one can always differentiate between an acute infection and true leukemia. There have been cases of infection reported in which 85 per cent. of the white cells were myeloblasts. The standard for the differentiation between a simple infectious leucocytosis and a leukemia as set by Hertz and other authorities does not enable one to make a correct distinction in all cases. This was first shown by Ruth in his report of a case of miliary tuberculosis presenting the blood picture of a myeloblastic leukemia.

Dr. Gilbert: There is one thing peculiar about these cases of apparent leukemia that occur with definite infections. In the ordinary type of reaction when there is an infection associated with a leukemia there is a drop in white count to about the normal number. In the case that Dr. Marshall reported and another case which we have now under study both of which had miliary tuberculosis, there is an increase in the white count up to 100,000. It may be that these cases are of two types, first those with the blood changes due to stimulation of the blood forming organs from infection without true leukemic changes, and the other type one with true leukemic changes with an abnormal reaction in cell production.

One of the interesting features of this case is the type of cell division because some years ago I was interested in studying the amitotic cell division in healthy regenerating tissue and I have been waiting a long time to find a frank pathologic case where the cells are multiplying as rapidly as they apparently are in this case. This seems to confirm some of my original observations that this kind of division occurs in very rapidly dividing cells, and may be only a modified form of the indirect or mitotic cell division.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, April 5, 1916

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

DEMONSTRATION OF A CASE OF PHAGADENA.

UDO J. WILE, M.D.

(From the Clinic of Dermatology and Syphilology, University Hospital, Ann Arbor, Michigan).

The case I wish to demonstrate is a most unusual complication of genital infection, a type we fortunately do not see very often any more but which at one time was exceedingly common. It is in no way a specific infection. It is a phagadena complicating a genital sore. By phagadena is meant a destructive, almost gangrenous process which advances with great rapidity. Bacteriologically it is due to a symbiosis of a number of very virulent organisms, associated with saprophytes. Phagadena, therefore, can complicate syphilitic chancre, and chancroid. A few cases of phagadena are on record complicating simple gonorrhea and not a few complicating a bite.

The question of etiology of phagadena always brings up the possibility of sexual perversion of one type or another. I saw within the last three months a case of extensive phagadena of the penis following a bite of the glans in which there was no syphilitic infection, and still another in which a chancre complicated the bite. The process usually progresses with great rapidity. The amount of destruction is extreme. Hemorrhage, indeed fatal hemorrhage, may occur from erosion of large vessels. In women, phagadena usually invades the thigh and in cases of complicated chancroid the entire anterior surface of the thigh may be involved in an extensive gangrenous slough.

The case which we present tonight (Figs. 1 and 2) is that of a man who exposed himself one month previous to his marriage which occurred two months ago. He denies, however, that the intercourse was in any way unusual or perverted. After marriage he developed a sore on the foreskin which extended very rapidly. The sore progressed so that at the present time it has involved, as you will see by the photograph, and as I shall show you by the patient himself, the entire superior surface of the glans penis and has laid open the superior margin of the urethra. After the ulceration had extended as far as it had when he entered the Hospital, it was difficult to say what the man had besides phagadena, whether the underlying process was syphilis, chancroid or a single bite, or some other form of infection. However, there are two points to be considered in the differential diagnosis. One is the relative painlessness of this process when it is associated with syphilis. One would assume that such an extensive ulceration would give rise to excruciating pain, and it usually is so unless it accompanies a chancre. The second point of diagnostic importance is the amount of induration present. The anterior lip of the penis was firm and hard and the characteristic induration of the chancre remained. The proof of the nature of the process really was established by the man's wife who presented herself with a typical secondary syphilid of the vulva and an eruptive syphilid of the body. That confrontation, the wife having an ordinary syphilis, is the best proof that there is nothing specific in the syphilitic virus itself to produce phagadenic infection, and that such infection is a secondary one.

The results of treatment are strikingly favorable considering the amount of destruction which takes place. In this case I would say that it would be inconceivable for the patient to have a perfect result without a plastic operation because with the urethra laid bare as it is on the superior surface, scar tissue must

result, which will certainly result in stricture so that it may be necessary to produce in this patient an artificial hypospadias. He now has an artificial epispadias, as the meatus is about an inch away from the ulcerated part of the upper surface of the urethra. I hoped Dr. Loree would be here to discuss this phase of the case. It would seem to me that the stricture would

Chancre complicated with phagadena. Lateral view.

be too firm to dilate and, therefore, it would be necessary to make an artificial meatus.

As a complication one should consider the possible cystitis and ascending pyelonephritis which might occur. Such cases as this have even been mistaken for epithelioma and the entire penis occasionally has been amputated together with complete dissection of the lymph glands.

CASE 2. A case of sarcoma of the thigh treated by the X-ray, followed by general sarcomatosis.

This case is one of more than usual interest, I think, from many aspects, particularly from the aspect of the general surgeon and dermatologist. The patient whom I shall present in a moment, I was asked to see by Dr. Darling a year and a half ago. He had on the under surface of the right thigh a circular tumor, fungating, perfectly round, about the size of a pancake and five inches in diameter. It bled easily, was attached to the skin by a very thick pedicle, somewhat broader at the margin than at the base, of a peculiar bluish color where it was attached to the skin and extremely firmly attached to the underlying tissue. At that time I suggested that the case was either one of sarcoma or infective granuloma. The mass had grown very rapidly and the question came up as to what form of surgical interference should be instituted. It seemed to me that if the tumor mass were a sarcoma then it was far too late to think of any surgical interference which could be of the slightest benefit. Amputation would have been the only possible operation which might have been thought of. A simple excision, of course, would have been useless, but amputation might have been carried out with every chance of a failure. On the other hand, if the lesion were an infective granuloma certainly one would not wish to amputate, and the danger of excising such a growth where the diagnosis was in doubt is obvious. I therefore recommended that the patient be given X-ray. He was X-rayed with the most satisfactory result so far as the original lesion was concerned. It completely disappeared and left a linear scar much as though an operation had been performed. One year and a few months later the diagnosis is substantiated by the appearance all over the body of metastatic nodules, dark purplish red in color, some of them colorless, varying in size from a grain of sand to the size of a large walnut, associated with a fairly

Chancre complicated by phagadena. Exposed dorsal surface of urethra shown near distal end.

marked cachexia and with the picture of general sarcomatosis.

General sarcomatosis of this type always presents itself in exactly this way as non ulcerative (in metastases) relatively painless tumors, being painful only where they are subjected to constant trauma and having a very grave prognosis. It is particularly interesting to note that the X-ray to-day if applied to any of these

tumors for one or two exposures, causes them to disappear but they reappear in a few days, and keep on coming.

Histologically these tumors are either the large or small round cell types, or they are of the angiosarcomatous type, being made up of blood spaces with the radiating sarcoma cells arranged around. In this particular type I felt that the tumor was an angiosarcoma because of the apparent vascularity of the tumor masses. However, I was incorrect in this. The microscopic picture shows it to be a very marked large, round cell sarcoma with beautiful kariokinesis.

This is not the only type of general sarcomatosis which occurs in the skin. One type is the idiopathic pigmented sarcoma or hemorrhagic sarcoma. This begins in the extremities, has a very marked racial distribution, occurring almost exclusively among the Galician Jews, and among men. There are about 100 cases on record. This racial distribution has been somewhat shaken in the past two or three years by the demonstration of this type of sarcoma in native-born Americans.

The tumors in the case before you vary in size from a grain of sand to a walnut. They are infiltrated into the skin above but are freely movable below. The back is one mass of these tumors. One would have great trouble in counting them. The patient feels perfectly well. The viscera are always involved later as well as the skin. One characteristic of this form of tumor is the frequent metastases to the choroid and retina leading to very early disturbances in vision. That has not occurred in this case. The extremities seem to be somewhat more involved than the trunk, but the tumors extend all over. The X-ray plates of the lungs are absolutely clear.

DISCUSSION.

Dr. Harry B. Schmidt: You mentioned metastases into the choroid. Are there any in other organs?

Dr. Wile: Yes, they metastasise everywhere in the body.

Dr. Harold de Blois Barss: I had more or less charge of this patient while he was in the surgical ward last year. At the same time that he was given this X-ray treatment, we started a stiff course of Coley's serum. I wish to give our roentgenologist due credit for his work, still so many cases are on record of improvement in cases of sarcoma of this type that I think we should take this into consideration. It may have been the X-ray which did all the work, but we have had several cases in our own service and the literature mentions many cases in which excellent results are being obtained by the use of the serum. Dr. Darling has a similar case now in private practice which he is treating with Coley's serum and he is getting at least temporary improvement. It would be interesting to find out whether Coley's serum in this case would affect the metastatic tumors.

Dr. Wile: He has been given Coley's serum on the outside without any effect.

A CASE OF CONSTITUTIONAL SYPHILIS ASSOCIATED WITH AN HALLUCINATORY MENTAL STATE.

Arnold L. Jacoby, M.D.

(From the Psychiatric Clinic, University of Michigan, Ann Arbor, Michigan).

The separation of the mental disorders of syphilitic origin and those mental states associated with constitutional syphilis into various classes has gone hand in hand with our modern methods of examination, particularly the laboratory tests. These disorders, other than general paresis, have been variously classified by different writers. Kraepelin in the last edition of his psychiatry classifies these disturbances partly on the pathologic and partly on the clinical basis and our case this evening would probably fall into the group of cases which he calls syphilitic pseudoparalyses. This group is further subdivided into the cases of simple dementia, expansive forms, Korssakow-like forms and the delirious forms of which our case is an example.

This man, E. B. is 37 years of age, a Canadian by birth, single, a farmer by occupation, who has received a common school education. He was brought to the Hospital by his family because they noted an acute mental change in him a week previously. He said jungle animals were after his cattle and he prowled about at night with a shot gun after them. He said everything was charged with electricity and that he collected it all. He talked rationally at times but was often abstracted and at times his actions were bizarre.

His family history is of no interest. His past history, however, is of greater importance. As a child he was always rather delicate and apparently not of the same mental capacity as his brothers and sisters. After his school days he led a very purposeless life, following almost every sort of occupation from time to time. Ten dollars a week is said to have been his average wage, although his brothers did much better. His habits were extremely irregular. He contracted syphilis at 21, that is, sixteen years ago, and shortly after had a severe gonorrhea. There were rather mild secondaries and it would seem that he received mercury irregularly for about three years following his in-

fection. About ten years ago, while a member of the Printers' Union in Detroit, he was called out on a strike. He then expressed ideas that spies were after him and became much disturbed. The family then sent him to his home where he remained on the farm until his admission to the Hospital. At home it was noted that he acted unusual in that he did his work very irregularly. He often would not start the day's work until four in the afternoon and spent much time abstracted and in so-called "brooding." The family, although they noted these things, overlooked them until the sharp change which occurred just before admission. Upon admission he was completely disoriented and showed a marked retentive memory defect. His manner was consistently pleasant, always greeting us cheerily on each visit, but unable to recall ever having seen us before. He said he remembered having left his home in northern Michigan on a Sunday but he did not know how long ago Sunday was. He remembered the depot and he "guessed" the Hospital was the depot. He told us of voices talking to him but did not elaborate upon these. He was observed at times wandering about the ward nude and oblivious to his surroundings and occasionally was seen in an attitude of prayer.

His physical examination was negative, except for a slight enlargement of the liver. He was well formed and of average size. The pupils were unequal in size, and dilated, measuring about 5 millimeters and 6 millimeters. They were somewhat irregular and sluggish in their reaction to light. They reacted in accommodation normally. There were very prominent tremors about the mouth and of the tongue on protrusion, and a slight inequality was noted in retraction of the lips, the right side drawing back further than the left. The deep reflexes of the arms were very prompt. The right knee jerk was diminished, the left one absent and both Achilles were absent. There was a definite articulatory speech defect but elisions of syllables or words were not present. There was a loss of sense of position in the two middle toes of both feet with the loss of ability to localize touch in these same toes. There were no other sensory changes. The urine and the blood count were negative. The Wassermann on his blood was ++++. A lumbar puncture revealed two cells per cubic millimeter. Nonne-Apelt, Phase 1 Pure +, and with a dilution of two negative. Nissl-Esbach reaction showed the quantitative albumin to be .0175 per cent., which is within normal limits. Lange's colloidal gold test was negative and the Wassermann on the fluid was negative. The differential blood count showed 30 per cent. of mononuclears, 68 per cent. polynuclears, 1.6 per cent. eosinophiles and .4 per cent. mast cells.

After about three weeks in the Hospital, his mental condition began to improve and his memory returned, until now it is very difficult to demonstrate a memory defect. He was indifferent and mildly apathetic. He showed very little concern about his mental condition and frequently became very irritable when questioned. He felt that the experiences before coming to us needed no explanation, "they just happened like lots of other things in my life," and it was foolish and unnecessary for us to ask about them. It was noted at this time that he had no definite articulatory speech disturbance, although his voice was tremulous. Otherwise, the neurologic examination was the same as upon admission.

He was put upon salvarsan and mercury. There was a general physical improvement but there has been little change in his mental state recently. On the whole, he remains indifferent and apathetic, occasionally telling us of his particular attraction for electricity and cites many examples to prove his contention. He says that no explanation is necessary for this, it is simply a property peculiar to him. There is always a latent irritability, which shows itself when we attempt to question him more than he feels that we should. There is now no evidence, clinically, of any progressive organic deterioration. His attitude on the ward strongly suggests occasionally that he is hallucinating, but he will not tell us about it. A lumbar puncture done recently showed the pressure to be normal, 6 cells to the cubic millimeter, Nonne-Apelt Phase 1 Pure +, and in a dilution of two negative. The Nissl-Esbach estimation showed .04375 per cent. albumin which is very high. Wassermann negative. Unfortunately, the Lange test was not done. The left knee jerk, which was absent upon admission, can now be obtained upon re-enforcement, but the knee jerks are definitely unequal and the Achilles absent.

We must consider these definite neurologic findings as evidence of involvement of the central nervous system, either past or present. In view of the cerebrospinal fluid findings, which are practically negative except for an increase in the albumin content, it appears that there is an impairment of the central nervous system

and that the process is no longer an active one. Although the neurologic findings may suggest the presence of a tabes dorsalis, the laboratory findings do not bear out this conclusion unless we consider that a tabetic process has existed and has now become inactive.

Plaut in his monograph on the "Hallucinosis of the Syphilitic" (Monographien aus dem Gesamtgebiete der Neurologie und Psychiatrie Alzheimer and Lewandowsky, Heft 6) has classified these disturbances into acute and chronic forms. The acute forms are further subdivided into those occurring in secondary, tertiary, and in the late stages. These classes differ essentially in the time of appearance of the mental symptoms. This case may fall into the latter division. Two cases of this class are reported by Plaut who found positive Wassermanns on the blood, and no increase in the cell count of the cerebrospinal fluid in each. The Wassermann on the fluid was also negative in ordinary amounts, but positive in one case in increased amount.

The acute disturbance at the time of this man's admission to the Hospital was not unlike an hysterical dream state. Ilberg has reported a case (Ein Fall von Psychose bei Endarteritis luetica cerebri, *Ztschr. f. d. Ges. Neurol. u. Psych.* 2, 1, 1910) of cerebrospinal lues of endarteritic type which showed many hysterical states throughout the course and at autopsy the specific endarteritic changes were demonstrated. During the second month of our patient's residence in the Hospital he was extremely suggestible and it was very easy to put him into light hypnosis.

The neurologic findings, memory and speech disturbance at first, together with the positive Wassermann on the blood, might make the diagnosis of general paresis seem very apparent. However, the cerebrospinal fluid findings and the course of his disease are very different from those of paresis and the prognosis is of course much better.

DISCUSSION.

Dr. Udo J. Wile: I should like to ask Dr. Jacoby whether a general paresis could be definitely ruled out on the absence of the cerebrospinal findings. Some very interesting work has been done in connection with the spinal fluid findings in general paresis in a large insane asylum, I believe in the Middle West, where it was found that without any treatment at all there were great fluctuations in the fluid findings from week to week. In some of them the fluid returned almost normal, so it would be impossible to say whether the fluid was definitely involved. It would seem to me that this might be a possibility which would have to be kept in mind, that this case might be one in which the spinal fluid findings were held in abeyance, in which case it might be a general paresis. Were it not for the matter of slight danger to the patient, it would be very interesting to do a puncture and examine his grey matter for spirochetes. It would certainly clear up the diagnosis if there were any question as to whether it might be a paresis or not.

Dr. Jacoby: It is very true that cases have been reported in this country, from Hopkins particularly, of a very definite paresis in which the cerebrospinal fluid findings were absolutely negative. However, the patients had all received intraspinous treatment. The more important thing in this case is the extremely long duration of his condition and absence of definite signs of organic deterioration. For a paretic it is all out of keeping with our teaching. His mental symptoms began ten years ago and were of a paranoid or hallucinatory type, and he has never been right since, although he was able to support himself and father and mother in the restricted community in which he lived. His syphilis is sixteen years old. I think that probably at autopsy this man would show definite blood vessel changes in his brain, but not the true paretic process, and certainly not that of a meningitis.

A CASE OF MULTIPLE PREGNANCY WITH ECLAMPSIA; ABDOMINAL CESAREAN SECTION WITH RECOVERY.

Rudolph A. Bartholomew, M.D.

(From the Clinic of Obstetrics and Gynecology, University Hospital, Ann Arbor, Michigan).

A statistical study of any considerable number of cases of eclampsia, will bear out the fact that this complication is much more likely to occur in cases of multiple pregnancy, and that the percentage incidence of multiple pregnancy is several times as great in a series of eclamptics than in an equal number of normal pregnancies. To quote from, "A Consideration of Vaginal Cesarean Section in the Treatment of Eclampsia based upon a study of Five Hundred and Thirty Published and Unpublished Cases," by R. Peterson; *American Journal of Obstetrics*, Vol. LXIV No. 1, 1911, the author concluded. "Multiple pregnancies are much more common among eclamptics. Twins are four and a half and triplets ten and a half times more frequent in this complication. Therefore, multiple pregnancy probably acts as a contributory cause of eclampsia." The following case is of interest, not only as a further illustration of this feature, but on account of the treatment of the condition.

The patient, V. D. Obstetric number 1314, nullipara, age 22, entered the Maternity Hospital January 27th, 1916, about seven months advanced in her first pregnancy. Past history negative except scarlet fever at 9, and diph-

theria at 14 years of age, with good recoveries. The last normal period occurred May 15th to 23rd, 1913; fetal movements were first noticed about the middle of November and were always very active. There had been no more than the normal amount of nausea and vomiting early in the pregnancy and no symptoms of toxemia. It is of interest to note that there was a history of twin pregnancies on the paternal but not on the maternal side. The patient's physical examination was negative, except that the abdomen seemed larger than could be accounted for by a single fetus at that stage of pregnancy. Palpation revealed multiple pregnancy, one child presenting by the head as an O. L. A. and the other by the breech as an S. R. P. The diagnosis of twin pregnancy was rendered certain by the presence of heart sounds corresponding to these two positions. When auscultated simultaneously by different observers, the rates were never found equal but differed as much as seventeen beats per minute. An X-ray was taken and two fetal skeletons distinctly demonstrated. The patient's blood pressure was 125, and the pelvic measurements were normal.

Pregnancy continued normal and uneventful, the urine showing no trace of albumin on any of the weekly examinations. On the afternoon of February 15th, the patient complained of rather severe headache, swelling of the ankles and spots before the eyes. She had noticed these symptoms for two days but had not thought it worth while to mention them. The blood pressure was taken and found to be 160, and a specimen of urine obtained at once, showed a heavy test for albumin and a moderate number of granular casts.

She was put to bed at once on a milk diet and given a liberal dose of saline cathartic. All urine passed was saved and the patient was closely observed for the development of further symptoms. She slept very little that night on account of headache, nausea and occasional vomiting. During the fifteen hours, from 3 p. m. to 6 a. m., about fifty ounces of urine were voided, and the Esbach showed one and a half gram of albumin per liter; the sediment revealed only an occasional granular cast. The bowels moved very freely during the night. In the morning the headache became very intense, worse over the left eye, and she complained of seeing large balls of fire before the eyes. The nausea and vomiting became more severe but the edema was less noticeable than on the previous day. There was no marked epigastric pain, but during the morning there was a rapid failure of vision in the left eye so that the patient was unable to count fingers held before that eye. The pulse was noticed to be intermittent and irregular, and the blood pressure was now 210.

It was only too evident that the patient's condition was becoming worse very rapidly. While the treatment of the case was being discussed, the patient was suddenly taken with a typical eclamptic convulsion. A consideration of the various features of the case pointed to abdominal Cesarean section as the most favorable method of treating the case, inasmuch as the patient was a nullipara, nearly full term, with a rigid undilated cervix, due to the fact that there had been no labor pains as yet. The patient's condition was so serious that slower methods of delivery, such as packing, introduction of a rubber bag, or even manual dilation, and extraction were manifestly contraindicated. Furthermore, the risk to the twins in the longer method of dilatation and extraction would have been much increased due to continued convulsions of the mother during the delayed delivery, trauma of extraction through a rigid undilated birth canal, and the possibility of locking of the fetal heads, since one was a breech, and the other a cephalic presentation. The patient was a good risk for Cesarean, inasmuch as there had been but one convulsion, the membranes were intact, and there had been no vaginal examinations. The toxemia could be lessened during operation by permitting bleeding from the wound, and replacing this with saline subcutaneously.

The abdomen was prepared with iodine and the patient was ready for operation at 1 p. m., about one hour after the first convulsion. Very little ether was required as the patient was so profoundly toxic. A median incision was made by Dr. Peterson extending about three inches above and below the umbilicus and the uterus incised without delivering it through the wound. The twins were quickly and easily delivered and cried at once. They were both males, each weighing about six and one-half pounds. The placenta was then separated with the membranes and was found to be single with a cord arising from opposite sides. The uterus was allowed to bleed freely during the repair and saline was given subcutaneously. There were five convulsions in all, four before delivery, and one during the operation.

The patient was returned to bed with a pulse of 60, and reacted in several hours, and seemed entirely rational. The vision in the left eye returned rapidly and was apparently normal the same evening. It was found necessary to

cleanse the vagina with iodine and pass a sound up the cervical canal about seven hours after operation on account of absence of drainage, apparently due to an adherent shred of membranes or clot. This was successful and there was the usual amount of drainage thereafter. The recovery was uncomplicated except for a slight infection of the abdominal incision, which developed about the fourth day and was opened and drained for a few days, ultimately healing well. The urine cleared very rapidly and albumin and casts were absent after the fifth day. The blood pressure gradually returned to normal, and the patient was discharged in good condition.

With a knowledge of the decidedly increased susceptibility of cases of multiple pregnancy to the development of eclampsia, it is of great importance to see that such patients are more carefully observed during pregnancy, and instructed to report any symptoms suggestive of toxemia.

DISCUSSION.

Dr. Howard H. Cummings: The subject of eclampsia is always an interesting one, because we know so little about its etiology. When Dr. Bartholomew started to read the case history it occurred to me that the case reported might be one of nephritic toxemia. This patient had eye disturbances and headache early in the disease which points more to a nephritic than an eclamptic condition. However, after operation the symptoms and signs cleared up too quickly for a nephritic toxemia.

Vaginal Cesarean section for eclampsia has been advocated by a few men for the past fifteen years, and recently this method has gained in favor. However, in a primiparous woman, with a rigid cervix, trouble is sometimes encountered. Abdominal Cesarean section in clean cases seems preferable.

In spite of the vast amount of research work that has been done on eclampsia we have in the literature to-day perhaps forty theories as to the etiology of this disease, but the cause is not known. This much has been learned, that the sooner the uterus is emptied after the beginning of eclamptic convulsions the better for the patient and child. Abdominal Cesarean section in primiparous women accomplishes this. In multiparous women vaginal Cesarean section is extremely satisfactory.

Dr. Ira D. Loree: I would suggest that you do a functional kidney test upon all your cases of eclampsia. If the functional kidney test is below 10 per cent. for a two hours sample of urine, send a sample of blood for an estimation of its urea content. You will find that in some of these patients who are passing large amounts of urine the urea content of the blood is very high.

Dr. Bartholomew: I might say that on a case that occurred last fall we did a urea content on the blood. It was a case which resulted fatally with very profound toxemia. The urea content as I remember it was very little if any above normal. It was .5 and that is the upper limit of normal, I believe.

I should like to ask Dr. Wile whether there is any connection between the very high blood-pressure and the very intense itching of the skin the patient complained of.

Dr. Wile: No, I should say that it was analogous to the pruritus which sometimes occurs in association with nephritis, and particularly with the old nephritic cases in which there is a retention of urea and urea in excess in the sweat. This accounts for irritation of the skin, a very high content of urea and other salts as well in the sweat.

OBSERVATIONS ON THE TENDENCY OF THE DIPHTHERIA BACILLUS TO LOCALIZE IN THE UPPER RESPIRATORY TRACT AND THE IMPORTANCE OF THIS FACT IN ROUTINE CULTURE WORK.

Damon Orian Walthall, B.S.
(From the Department of Pediatrics and Contagious Diseases, University of Michigan, Ann Arbor).

In the culture work at the Contagious Hospital a definite, routine method is followed in passing the swab or platinum loop over the mucous membrane of the upper respiratory tract, and as much of the mucous membrane is touched as is possible. It is not always possible to select one particular spot, where the organisms might be expected to be more abundant.

The contagious hospital intern takes all cultures except the routine cultures at the Contagious Hospital which are taken by the nurses or the students on the section. Several demonstrations of culture taking always precedes their doing this work.

Because of past experiences in finding that the organisms of diphtheria may be present in the larynx and absent in cultures taken from the nose and throat, or positive in the nose and absent in the throat and so on, at the suggestion of Dr. Cowie I have made a number of observations with this point in view.

Of the eight cases which I wish to report upon, the organisms confined themselves to one locality—Group I—in five cases; to more than one locality—Group II—in three cases.

GROUP I.

Case I. Marian Y., age 20, entered the Contagious Hospital service January 5, 1916—laryngeal diphtheria. General culture in this case taken in the beginning of the illness, January 2, 1916, was negative. The organisms were present in cultures taken directly from the larynx until January 4, 1916. After this cul-

tures were taken from the tonsils and pillars, the pharyngeal wall, lateral bands and from the nose. They were always negative. Total cultures 24, covering a period of twenty-eight days—antitoxin 10,000 units intravenously, 20,000 intramuscularly.

CASE 2. Ernest D., age 23, entered Contagious Hospital February 29, 1916—clinical laryngeal diphtheria, mild. Organisms were present in cultures taken from the larynx, always absent in cultures taken from the tonsils and pillars and from the pharyngeal wall and lateral bands and nose. Total cultures 28, covering a period of sixteen days. Antitoxin 10,000 units intravenously.

CASE 3. Ione O., age 25. Clinical uni-tonsillar diphtheria, marked. Entered February 8, 1916. Diphtheria organisms were always present in cultures taken from the right tonsil, always absent from cultures taken from the left tonsil and pillars, the paryngeal wall and lateral bands and from the nose. Total cultures 32, covering a period of eleven days. Antitoxin 10,000 units intravenously, 10,000 units intramuscularly.

CASE 4. Luella S., age 21, marked clinical diphtheria of the lateral bands. Entered February 25, 1916, with positive general cultures Janury 26th and 29th. Special cultures began February 1st. The organisms were at all times present in cultures taken from the pharyngeal wall and lateral bands, but were never found in cultures taken from the tonsils and pillars and from the nose. Total cultures taken 25, covering a period of twenty days. Antitoxin 10,000 units intramuscularly, 10,000 units intravenously.

CASE 5. Ruth W., age 21, carrier. Entered the Contagious Hospital December 2, 1915, nose bleed two weeks before. General throat culture negative, nasal culture positive. Nose and throat cultures taken simultaneously always showed organisms in those taken from the nose, but never in those taken from the throat. Total cultures 30, covering a period of twenty days. The patient was discharged from the Hospital after three negative cultures, which terminated December 22, 1915.

She returned to the Hospital with positive general throat cultures March 18, 1916, after which special cultures were again instituted. It was now found that a positive culture was always obtained from the pharyngeal wall and lateral bands, but never from the tonsillar fossae or from the nose. (This patient had an adenoid and tonsil operation previous to her first entrance to the Hospital). Total cultures taken 27, covering a period of twelve days. Patient is still under observation. Schick test is negative.

GROUP II.

CASE 6. John S., age 2, carrier. Entered the Hospital February 9, 1916. This patient has hare-lip and cleft palate, enlarged tonsils and visible mass of adenoids. General culture positive February 13, 1916 and continued so until March 16, 1916 when special cultures were begun. Positive cultures were now confined to the tonsils and the visible mass of adenoids. They were never positive when taken from the nasal mucous membranes. Total cultures 24, covering a period of thirty-eight days. Patient still under observation.

CASE 7. Harry S., age 29, carrier. Entered the Hospital February 16, 1916 with facial erysipelas. General culture was positive on February 27, 1916 and continued to be so until March 13, 1916, when special cultures were started. The organisms were now present in cultures taken from the pharyngeal wall and from the pharynx, taken *per os*, but were never found in cultures taken from both tonsils, anterior nasal passages, both right and left, or from the external auditory canal. This patient had been operated upon for mastoid a few days before entering the Contagious Hospital. Positive cultures were obtained from the mastoid wound on three different days. Patient still under observation. Total cultures taken 36, covering a period of thirty-eight days. It may be of interest to note that a long type of diphtheria organism is present in this case. It has been thought that these organisms are more virulent than the short ones.

CASE 8. Sarah S., age 4, clinical nasal diphtheria December 22, 1915, which cleared up in a few days without any antitoxin. The patient was detained because of exposure to chicken-pox before entering the Hospital. General routine throat culture was positive January 26, 1916. Special cultures were begun February 2, 1916. They were taken with a swab. Those from the tonsils and pillars, pharyngeal wall and lateral bands were always positive while those from the nose were always negative. The tonsils in this case were so large that it was impossible to reach the pharynx with a swab without touching them. A stiff platinum loop was substituted for the swab. February 11, 1916. The cultures were now positive from both tonsils and negative from the pharyngeal

wall and nose.. Total cultures taken 48, covering a period of seventy-five days.

CONCLUSIONS.

1. All parts of the mucous membrane of the upper respiratory tract must be touched in making a satisfactory general culture.

2. The pharynx may be cultured and be negative for Klebs-Loeffler bacilli, but the organisms may be present in the nose or in the larynx and thus not be found except by special technic in culture work. Nose bleed and hoarseness or loss of voice should attract attention to the nose or larynx.

3. Sterile cotton swabs are found to be most adaptable for getting culture material from all parts of the upper respiratory tract. Second in preference for culture taking is a platinum loop. The platinum wire must be quite heavy and stiff in order to prevent its curling and bending. It can be used only in taking cultures from tonsils, pillars, posterior pharyngeal wall and lateral bands. It cannot be used in taking nose and laryngeal cultures because of danger of trauma to the mucous membrane.

4. Several cases in this series show the necessity of having more than one or two cultures to determine that diphtheria organisms are absent from the upper respiratory tract. In this Hospital at least three negative cultures are required before a patient may be discharged or before a nurse can return to the main Hospital for service.

5. This interesting and peculiar tendency of the diphtheria organisms to localize to one part of the upper respiratory tract should be an important factor in deciding upon a surgical or a medical treatment to eliminate the organisms from this part.

DISCUSSION.

Dr. Carl H. Laws: With regard to cultures taken by the students of the sections and by the nurses I would like to say that one student is selected from the section and is instructed in the technic of taking cultures. The nurse in charge of the ward is also thoroughly instructed before being permitted to take routine cultures.

It is an interesting and important point to find that a patient may have a laryngeal diphtheria and the cultures from the nose and throat be negative. That means that a laryngeal culture should always be taken when laryngeal diphtheria is suspected.

Dr. John A. Wessinger: Dr. Walthall's paper is a very interesting one to me on account of the position which I occupy as city Health Officer. During the year the number of swabs that come into my hands run into the hundreds, by no means all being positive. Some very interesting things have occurred in this line of work. I might go back quite a number of years and point out some things. I remember, it is now over ten years ago, two very prominent physicians in the City of Ann Arbor got into a very awkward position over a case which proved to be laryngeal diphtheria. Physician one diagnosed it as negative; physician two diagnosed it as diphtheria. There were no cultures taken. The child died and the autopsy showed extensive tracheal and laryngeal involvement with diphtheritic membrane and cultures from the larynx and trachea were positive, while cultures from the upper respiratory tract were negative. I can see, of course, some difficulty in getting antemortem cultures from the larynx. We haven't attempted that. We get them from the nose and throat. My instructions are to get them from every part of the upper respiratory tract, because there is no doubt but that the diphtheria organism tends to localize itself. It may be on one tonsil and not on the other. It may be in the nose and not in the throat. That to me from a public health viewpoint is important, and the most important question is the carrier and how to get rid of the carrier. That is a problem which has confronted us more than any other one thing. A little over two years ago we undertook an investigation here in the city on account of an outbreak of a number of cases of diphtheria at the Tappan school. We examined about 175 children and out of this number found twenty-one carriers. Four of these were nasal only. The remainder were throat, tonsils and pharynx. We had a good deal of difficulty in clearing up the nasal cases.

That leads up to the best method of getting rid of the carrier. There are three or four different viewpoints along this line. There is a man in Cleveland who has brought out something very interesting lately. He says the only thing to do is tonsillectomy and adenoid operation, while some equally able men in Chicago say that that is not necessary and that the same work can be done just as successfully chemically, and they do it with kaolin. Then there is another class of men who rely upon bacillary methods, a bacillus which is antagonistic to the Klebbs-Loeffler bacillus. I believe that there will be some day a bacillus found which will destroy the Klebbs-Loeffler bacillus. Some believe that the lactic acid bacillus does that. I recall an outbreak at the Mayo hospital where six nurses became infected with diphtheria and the men in charge were at a loss to know how the disease got into the hospital. They found that the chef was a carrier. Dr. Wood, the health officer of Rochester gave me their technic in getting rid of the organism. A great many men claim that all that the lactic acid bacillus does is to hide the diphtheria organism and that afterwards the original organism is just as virulent. So far as our limited observation goes that does not hold. I recall a student who had a very virulent pure culture of diphtheria. He wasn't very sick but was advised very strongly to go to the contagious ward. He was furnished with a gallon of sour milk the night before he went to the Hospital and the next day there was no diphtheria bacilli in the throat and we had him under observation for three months and there were no Klebbs-Loeffler bacilli to show up. Evidently pretty *effectually* covered up.

When Dr. Canfield does a tonsillectomy there will be no more diphtheria in the tonsils, and when he does an adenoid operation there will be no diph-

theria there, but I want to say that I see a good many throats where tonsillectomies have been done that are still very capable of developing diphtheria organisms in them. People say, "How is it, doctor, my tonsils were removed?" The fact is they were not removed. They were cut in two or shaved off. When a tonsillectomy is done correctly it is all right.

As far as kaolin goes, one man says that it is very valuable. All that is necessary is to blow a little of it into the throat and it will destroy the organism. Another body of men say that it does not do it. So I think after all that a good tonsillectomy will get rid of the carrier, and so will an adenoid operation, but it seems to me that what we are coming to eventually will be the baccillary route.

Hewlett of London and Wassermann have both brought out an endotoxin by which they hope to destroy the bacillus. So it will either depend upon the bacillus direct or an endotoxin or some other preparation to do the work.

I may say a word in passing relative to the lactic acid bacillus. We had great trouble in preparing a spray which is sufficiently concentrated to do the work, so we simply whipped over to the ordinary sour milk and had the patients use that. By this method we attained negative throats and noses in from ten days to two weeks and there has been no case of diphtheria in the Tappan school since. In the past year we have only had three outbreaks in the city. The year previous to that we had seven and farther back it ran very much higher. You would be surprised to see the number of people that are using sour milk in this town. If it has no other value, it is a good food and can do no harm.

Dr. Alvin Lorie: In St. Louis we have had two frightful outbreaks with over 6,000 cases of scarlet fever and diphtheria and it has been rather difficult to turn these patients loose carrying the organism of diphtheria. We have used kaolin to quite an extent. It is a mechanical remover. It never acts unless you absolutely apply it thickly to every part of the mucous membrane. You can't do that by blowing it into the nose or mouth. Some of the children we have had swallow kaolin. In some of these cases it is marvelous the way the diphtheria will clear up. We have examined the kaolin after it has been removed and it was simply loaded with bacteria. It simply acts as a mucilage to take up the germs and mechanically remove them.

Dr. R. Bishop Canfield: I would like to say one word with regard to the effect of adenoid and tonsil operations upon the diphtheria carrier. No matter how well the operation is done, it does not remove all the tissue of the nose and throat which forms a suitable resting place for the bacteria. There is the rest of the lymphoid ring in which infection takes place quite as often as it does in either the tonsil or adenoid. Probably the infections which occur in the adenoid and tonsil, especially the tonsils, are more virulent than those occurring in the more superficial lymph tissue, the crypts of which are more superficial than they are in the adenoid and tonsil. These infections which occur in the parts of the lymphoid ring other than the adenoid and tonsil are more easily diagnosed and are apparently more superficial. The local manifestation in the throat is more readily seen, at least it is seen more early in the course of the disease, and in this connection we must not forget that the lingual tonsil is a part of the lymphoid ring and it usually is overlooked in taking cultures. Consequently I have seen several cases of diphtheria of the lingual tonsil which had escaped detection when cultures had been taken.

It is a very satisfactory thing that our contagious diseases are being so carefully watched and that the investigation with regard to carriers of different infections is being so scientifically done.

LANTERN SLIDE DEMONSTRATION OF THE MONTH'S RADIOGRAMS.

James G. Van Zwaluwenburg, M.D.

(From the Clinic of Roentgenology, University Hospital, Ann Arbor, Michigan).

1. A case of cardiac, hepatic, and splenic enlargement in an infant, endocarditis.
2. Separation of the epiphysis of the internal condyle of the humerus.
3. Comminuted fracture of radius and humerus. Railroad accident.
4. Fracture through the trochanter major in a child.
5. Tuberculosis of the shoulder joint, with large sequestrum.
6. Tuberculosis of the tarsus.
7. Bony anchylosis of the knee, old pus joint.
8. Suppurative arthritis of the knee with gas bubble in the sinus.
9. Unerupted canine teeth in an adult.
10. Ulcer cicatrix in the duodenal cap.
11. Duodenal ulcer with "nieschen" and cicatrix.
12. Pelvic adherent appendix.
13. Peristalsis in an airfilled stomach, with duodenal ulcer.
14. Retrograde filling and dilatation of the duodenum, following pyloric resection and subsequent jejunal obstruction.
15. Extragastric tumor, enlarged liver.
16. Acute miliary tuberculosis.
17. Extensive chronic pulmonary tuberculosis.
18. Cavernous tuberculosis, "cured" twenty years ago, probably amyloid disease.
19. Traction dilatation of the trachea in tuberculosis, simulating cavities.
20. Mediastinal Hodgkins in a small boy.
21. Enlarged thymus disappearing under X-ray treatment. Leukemic metaplasia of thymus tissue.
22. Primary malignancy of the lung. Reduction of the mass under treatment.

23. Hypoplasia of the right arm. Photograph.

The case represented by slide No. 19 is of more than ordinary interest.

It was referred to us with the request that we confirm the internists' findings of a cavity in the right upper lobe. As not infrequently happens, we were able to demonstrate only an extensive fibrosis with consecutive distortion and dilatation of the trachea.

The danger of confusion of these two conditions seems not to be sufficiently appreciated. The underlying pathologic anatomy is perfectly clear, and it is logical to suppose that the air-filled trachea, brought near the surface and covered only by dense, well conducting tissue should give the classical signs of cavity, but I do not recall ever having seen or heard it mentioned in connection with the diagnosis of cavities.

In many cases the deviation of the trachea may be made out by palpation of the suprasternal notch, and a wide deviation should lead to the suspicion of tracheal dilatation rather than cavity.

The case represented by slide No. 13 is interesting as giving us a side-light on the motor function of the empty stomach.

We are rather under the impression that the normal empty stomach is at rest, except for the "stomach systole" associated with hunger-pangs. But we really know very little about it since we have no way of seeing what transpires in the empty stomach. It can not be shown by the radiogram and after the introduction of any instrument the stomach is no longer empty.

Here, however, the stomach is virtually empty, only a small amount of barium remains adherent to the wall, just enough to outline the gas filled cavity. It will be seen that there are four well defined and evenly spaced peristaltic waves along the length of the organ.

It should be remarked that this is not a normally behaving stomach, there being good evidence of a duodenal ulcer, with a reflex hyperkinesis, and this persistent peristalsis is probably another expression of the results of local irritation in the duodenum.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, May 3, 1916

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

ANOMALIES OF THE FIFTH LUMBAR IN RELATION TO BACKACHES.

JAMES G. VAN ZWALUWENBURG, M.D.
(From the Clinic of Roentgenology, University Hospital, Ann Arbor, Michigan).

The interest and timeliness of a medical subject depends on a number of factors. A condition may be so frequently seen and in so various a form that it is always timely. Or it may gain interest from recent advances in our knowledge of the disease, or from its rarity, or its obscurity, or from an unusual number of cases seen in a given time.

The subject we have chosen falls under the last two heads. The study of the fifth lumbar, its variations and their relation to pain in the back, is as old or older than orthopedics. In the course of our work, we have from time to time recognized occasional examples with a mild degree of interest, but, during the month of March, the number of cases coming from several different clinics, engaged our attention from sheer force of numbers, and our subject thereby becomes doubly "timely."

The fifth lumbar vertebra is notoriously a variable structure. It has long been known that no two fifth lumbars are exactly alike, but the anatomist has been content to limit his studies to the gross variations such as failure of closure of the posterior arch, or inclusion in the sacrum. As an anatomic study, the appearance of the fifth lumbar in the radiogram has been described by Lufhoff (*Fortsch. Geb. Roentg. Strahl.* IX and XI) and by Scheede (Idem XVII, 355). It is here brought out that this vertebra is peculiar in that the lateral borders of its body are rarely distinctly projected, and that the lower margin is almost never shown on the plate, whereas these are striking features of all the other vertebrae. The explanation is found in the fact that, in distinction from all others, the anterior surface of this centrum gradually merges into the lateral pedicles without anywhere approaching a plane parallel to the X-ray, while in the normal curvature of the spine, its lower surface is so far inclined from the path of the ray that it virtually overlaps the upper border of the sacral body. In addition to this, the body of the fifth is more cancellous than that of any other vertebra and casts a lighter shadow.

The variability in the size, in the position with reference to the level of the iliac crests, its inclination to the vertical axis, and in the planes of the posterior articulations are matters of common knowledge.

Some of these variations, we have learned are associated with definite pathology, and so have come to be classed with the pathogenic factors of several conditions. For instance, we have come to regard with suspicion the fifth lumbar whose body does not rise above the level of the iliac crests. The position of the lower border of the centrum is less well known because less frequently seen on the plate. The inclination of the axis of the centrum to the vertical axis of the body is found to be not merely a matter of lordosis, at least it can not be reduced by flattening out the back against a hard table. It would seem as though the normal lordotic curve in this region had its point of maximum curvature at a point higher than normal, virtually including the last lumbar with the sacral portion of the spine.

Associated with these abnormalities are fairly characteristic changes in the form and size of the lateral processes. They are often markedly increased both in length and in width, frequently being flattened out into broad bilobed structures tipping in a plane upwards and backwards.

When well developed, they justify the name that has been applied to them, viz., "butterfly transverse processes."

Not infrequently these processes are truncated, flattened off, and otherwise shaped to conform to the shape of the adjacent lateral bodies of the sacrum or the iliacs, and occasionally the extremities are definitely facetted on both the contiguous surfaces to form an imperfect articulation. Such articulations are more frequently with the lateral bodies of the sacrum than with the ilium. Sometimes there seems to be a bony union between the opposed surfaces.

The posterior arches may show associated changes. Most frequently they appear much narrower than normal, as though compressed from above downward, the spinous processes may be much abbreviated and deflected from the vertical, so that the spines of the lower lumbars may be "staggered" like the shingles of a roof.

The plane of the posterior articulations normally is not in the sagittal plane of the body as are the rest of the articulations, but are directed outwards as well as backwards. This outward rotation is often much exaggerated, so that these articulations are not at all well seen on the plate. The height of the process is also reduced.

Where the complaints are of comparatively long standing, we often see inflammatory changes in the nature of calcified exudates. The earliest manifestations are a certain haziness about the posterior articulations, if these can be seen at all. Not infrequently the articulations between the last lumbar and the sacrum are obscure from the unusual obliquity of the articular plane; an early change can not be made out here, but appears one segment higher. In addition we may find a slight density along the course of the great iliolumbar ligament, or along the lumbosacral ligament, or slight erosions of the bones at the point of contact, and, finally, we may find the lipping of the margins of the centra characteristic of "hypertrophic arthritis."

These abnormalities in various combinations and in various degrees are commonly spoken of as a "Sacralization of the Fifth Lumbar."

The fundamental conception of this term is that of an upward shifting of the pelvic girdle on the spinal axis. If this shift represents the whole of one segment, we find only four lumbar vertebrae, an abnormality that has occasionally been noted. An analogous downward shift produces an extra lumbar, i. e., a total of six lumbar vertebrae, a condition that is much more frequent, especially in the Esquimos and certain primitive tribes in Africa. Usually the shift is upward and amounts to only a fraction of a segment and the result is the condition here described.

A similar upward shifting of the thoracic cage in relation to the spinal column is supposed to occur independently or with this condition. It gives rise to the formation of cervical ribs and less frequently to hypoplasia or even aplasia of the twelfth ribs. There is a general impression that cervical ribs and sacralization are frequently associated although I know of no statistics on this point.

The center of curvature of the "lordotic lumbosacral" curve of the spine lies about on a level with the fifth lumbar vertebral body. This curve is at once the sharpest and the most recently acquired of the spinal curves, is found only in man, and is directly related to his erect posture. It, therefore, depends directly on the position and insertion of the pelvic girdle. With the upward shifting of the latter, there is, of necessity, a similar upward shifting of the center of curvature, so that it comes to lie as high as the fourth lumbar body. This curvature is mainly produced by the wedge shape of the fifth body and the succeeding fibrocartilage. When it lies higher than normal, the excess in the length of the longer arc must be taken up at a higher level, and, in fact, we find the preceding fibrocartilage more wedge shaped while the succeeding one has become more nearly rectangular in cross section.

Normally the weight of the body is transmitted fairly directly to the sacral body, but with the upward shifting of the center of curvature, it comes to fall more nearly on the abnormally obliquely placed last lumbar, and the latter is forced to assume functions that are purely sacral. And, whereas the sacrum is adapted to this work by the firm fusion of its centra, lateral bodies, and posterior arches, the last lumbar is left suspended by its strong but inadequate ligaments between the abnormally high iliac crests.

The influences working on this vertebra are precisely those that originally produced the fusion of the sacral segments far down the phylogenetic tree, and their influence is directed in the same direction, viz., towards the expansion of the lateral processes, their fusion with the lateral bodies of the sacrum, the shortening and strengthening of the posterior processes and by their anchylosis their final incorporation into the posterior arches of that structure. This is the basis of the commonly used term "Sacralization of the Fifth Lumbar Vertebra."

The detailed discussion of the altered mechanical relationships, the redistribution of the various stresses and strains, would carry us too far afield. One can easily see that the chances of mechanical injury and the liabilitity of infectious and noxious influences in these structures are greatly increased thereby.

The material from which this selection of lantern-slides is taken comes from several clinics. The majority were referred from the Department of Orthopedics with the complaint of "backache," "lumbago," pain in the back radiating upwards into the flank and down into the thigh. Certain postures and certain movements aggravate the pain. Postures and attitudes are prominent features in the usual history. Pareses and altered reflexes are not uncommon as secondary manifestations.

Next in frequency are the cases referred from the Department of Genito-urinary Surgery. Here the finding was an incidental one. In the search for renal and ureteral calculi, the lumbosacral articulation is always included in the field examined, and is always inspected as a matter of routine. A number of these cases have shown one or more of these anomalous features. A history of pain radiating into the testicle appears to be common to these two conditions.

Two cases had been treated for long periods (elsewhere) for "sciatica." One case was suspected of concealing an intractible appendix, and one a Neisserian spondylitis. In several cases Pott's disease was suspected. One case (a girl of 22) had survived four laparotomies, gynecologic and otherwise, in a vain search for the cause of her pain.

From this it appears that the symptoms associated with these anomalies vary in location and in degree, and through a fairly wide range. Unfortunately, we are not in a position to define the exact relationship between the symptoms and the deformity of the spine. It must be confessed that not every case with a lumbar fifth like this description, complains of symptoms, nor does every case of backache showing these findings justify the conclusion that they are etiologically related. Several of the latter have had surgical kidneys. One of them did have a gonorrheal spondylitis. One of them did have a pathologic appendix. Nevertheless, a certain number had no other excuse for their backaches, and others had definite inflammatory changes which certainly incriminate the anomalous fifth lumbar as in some way related to the cause of the pain. Moreover, the frequency of this finding is much higher in those complaining of pain than in the normals, and the gravity of the complaints bear some relation to the degree of the deformity.

A direct etiologic relationship between these two conditions can not be predicated on the facts at hand. In the present state of our knowledge, the roentgenologist is not in the position to state dogmatically, "this patient's backache is due to a sacralized fifth lumbar," but this conclusion seems to be justified with a degree of probability increasing with the degree of the deformity. Our present position is rather that the anatomic conditions, the anomaly, shown by the radiogram are evidences of a predisposition to traumatic, toxic, and infectious processes, by reason of the imperfect adaptation of the structures involved to their function.

The inflammatory changes we consider mainly secondary. Indeed, it is not improbable that the ordinary lesion is always mechanical, slight strain, microscopic injuries to the capsular and ligamentous structures, with consecutive edema, exudate, cicatrix and calcification. These conditions provide an excellent soil for the development of infectious and toxic phenomena, which, in turn, predispose to trauma, and the vicious circle is completed.

A rational anatomic explanation of the direction of the referred pains is not possible. To be sure, the sacral plexus lies in almost immediate contact with the anterior surface of the pelvic bones and may very conceivably be involved in the exudate. The posterior spinal branches are even more closely associated with the site of the injury. On the other hand, the genitocrural is separated by a considerable thickness of the psoas muscle after having escaped from the spinal canal several segments above the site of the pathology and the latter can scarcely be accused of causing the testicular pain by direct involvement of this nerve. The upward radiation of the backache is another proof. We are forced to the conclusion that many of these phenomena are referred and not due to involvement of special nerves.

As to the treatment, that is a problem for the orthopedic surgeon. Rationally, one would advise rest until the inflammatory reaction has subsided, mechanical supports, correction of faulty postures, avoidances of strain on the articulation, removal of tonsils and other septic foci, and general hygiene.

Transversectomy has been done in a limited number of cases with indifferent results. The area is very inaccessable, and some very curious pareses have been noted. If our conception of the pathogenesis is correct, we should scarcely

feel justified in knocking the props out from under a structure that is already suffering from mechanical weakness. However, the problem resolves itself into the question whether the situation can best be improved by mobilization or by fixation of the parts. The natural tendency seems to be in the latter direction.

DISCUSSION.

DR. HARRY MALEJAN: I would like to ask Dr. Van Zwaluwenburg how he would explain some of the conditions of the bladder in these cases. We have had some cases with symptoms of cystitis and pus in the urine. In these cases there was no stone either in the kidney, ureter or bladder and no history of gonorrhea, in fact no exciting cause for cystitis. X-ray report, however, comes back as sacralization of the fifth lumbar.

DR. CONRAD GEORG, JR.: I happen to have one of these cases under treatment, a cement mixer.. He is a young man of 35, well built, has been a laborer all his life and has been a cement mixer for many years. About two years ago he had a septic infection of the hand and forearm and came to the University Hospital and was operated upon several times. He was here several months for treatment and came near dying. He had several incisions in the hand and some of the fingers were amputated. There was contraction of the scar tissue which resulted in a flexion deformity of some of the fingers. Last fall he began to complain of backache. At times the pain became so severe that he had to go to bed. When these attacks came on he was unable to lie on his back or sides on account of severe pain in the sacroiliac region. When I saw him he was lying on his stomach. I first thought of a local arthritis and then thought it might be rheumatic with some tendency to sciatica. Pressure over the left sacroiliac region caused severe pain. After a few days of rest in bed and medical treatment with salicylates he recovered sufficiently to go to work again.. The condition always relapses within a short time and he has been confined to his bed most of the time this winter. Finally in order to clear up the diagnosis I sent him to Dr. Van Zwaluwenburg and I have seen from the illustration that it is a very marked condition of sacralization of the fifth lumbar. There seems to be considerable increase of the transverse process of the fifth lumbar and the spine seems to be curved toward the affected side.. Since discovering the real condition of affairs I have advised this man to change his occupation and he is working now in a factory where he does not come in contact with moisture.

DR. CHARLES L. WASHBURNE: I would not want to say that these cases are all pathologic. There are as many variations of the fifth lumbar as there are fifth lumbars. If you could take an X-ray of the people in this amphitheatre, the chances are that some of them would show abnormalities and inflammatory changes in the region of the fifth lumbar vertebrae. The development of this condition depends largely upon the work which the patient does. There is a definite line of symptoms from which this condition may be diagnosed without the X-ray. It is not a new condition, but one that has not been well described in the text books in the past. It has been variously called sciatica, sciatic neuritis, rheumatism, etc,. and has been a source of profit to chiropractors and fakers all over the country.

There is an obliteration of the lumbar lordosis and as the patient bends forward, if the condition is on one side alone as it usually is, his anterior bend will deviate from the affected side. If it is on the right side, his body will lean toward the left. There is usually tenderness over the upper portion of the sciatic nerve. The patient sleeps poorly, has lost considerable flesh and the condition has extended over a period of months or years. He lacks the characteristic symptoms of tuberculosis. There is no destructive process of the bodies of the vertebrae.

Dr. Malejan asked about the relation of this to infection. There is no question but what a person can have a sacralized lumbar vertebra without any symptoms from it. If you associate this with gonorrhea or old chronic tonsillitis, you are almost certain to have pain and disability. Occupation has something to do with it. Book-keepers, writers, blacksmiths, engineers, plumbers, firemen and men working in factories have the symptoms most often.

The question of treatment has not been solved. Application of jackets and changes in occupation will relieve or cure most cases. Operation is attended with great danger to life. The depth of the wound is three to five inches, associated with this the lumbar cord of the lumbosacral plexus runs almost immediately in contact with the transverse process of the fifth lumbar and any operation on this bone will disturb the nerve supply to the leg. Fully 50 per cent. of the cases reported as operated for this condition have shown paralytic deformity after the operation. As yet we have not operated any of these patients.. If we find one sufficiently serious to demand operation and the patient, after being told of the possibilities of the operation, still insists upon having it done, we will operate.

DR. VAN ZWALUWENBURG: I am greatly flattered by the number of questions that have been asked, and only regret that lack of time prevents me from answering them seriatim and at length. I fear I have been somewhat misunderstood on several points. I think that I distinctly stated that a direct etiologic relationship between this lesion and the symptoms of which the patients complained could not always be established. It is, of course, perfectly irrational to suppose that an anomaly of the kind described should produce pus in the urine; these two findings must be assumed to be simply coincident.

What I have tried to emphasize is that we have here an anatomic basis for the greater frequency of trouble in this region in the unfortunate possessor of a sacralized fifth lumbar than in the normal individual. I have further attempted to show that in these cases of otherwise unexplained backaches, secondary reactions of an inflammatory nature are produced, and that in their presence, the chances of complete recovery are much worse than otherwise.

As to the literature; there is very little of it, although it has attracted a great deal of attention. The general attitude of the students of this subject is pretty well illustrated by that of a prominent orthopedist whom I met not long ago. He confessed that he already had four manuscript articles on the subject unpublished, and he was uncertain

whether they would ever be published. He, also, has come to the conclusion that the condition is important mainly because it presents a point of lessened resistance to infections, intoxications, and trauma.

REPORT OF A CASE RESEMBLING SPRUE AND REMARKS ON AMEBIASIS.

HARRY B. SCHMIDT, M.D.
(From the Clinic of Internal Medicine, University Hospital, Ann Arbor, Michigan).

I have been asked by Dr. Hewlett to demonstrate amebae from a patient who has amebic dysentery in the Medical Clinic at the present time. After several doses of emetine the amebae are not to be found. I have scraped the patient's intestinal mucosa as far as I could reach with the proctoscope, and have examined his stools and I cannot find any amebae, so it will be impossible for me to demonstrate them; but I can tell you something about the case, first calling your attention to another patient whom we had in the Clinic in the summer of 1914.

This patient entered the Hospital complaining of pain in the epigastrium, general weakness and sore mouth. He was 41 years of age, married, and a farmer by occupation. His family and personal history were unimportant. The present illness began six years before with distress in the epigastrium and belching after eating. In February, 1914 he began to have five or six stools a day unaccompanied by pain, tenesmus or blood. During February and March he vomited considerably and complained of great distress in the bowels. There was no blood in the vomitus. Since February he has lost thirty-five pounds and since that time his mouth had been sore.

The patient was extremely emaciated, and all the bony landmarks were prominent. No pigmentation of the skin or mucous membranes was noted. The mucous surfaces of the mouth were covered with white curd-like masses resembling thrush, and there were evidences of superficial erosion. The same was noted in the rectum and as high in the sigmoid as could be seen. There was nothing notable in the urine. The red blood cells were 2,300,000; hemoglobin 43 per cent. The examination of the stomach contents was negative. The systolic blood pressure was 85. The Wassermann was negative.

The stools were interesting, very large in amount from five to six a day, usually two or three in the morning, clay colored, very frothy and unformed. There were microscopic fat droplets in excess. The guiac test was occasionally positive. The temperature ranged from 99 to 101° up to the time of his death which occurred after he had been in the Hospital twenty-one days. He was placed on a strict milk diet and given Blaud's pills with bismuth. Under this treatment he continued to lose weight and died of exhaustion. No autopsy was granted.

The interesting features of this case were the emaciation, peculiar stools and the thrush-like condition of his mouth and rectum. Dr. Wile examined the patient and pronounced the mouth condition a stomatitis. This triad of symptoms, extreme emaciation, secondary anemic ulceration of the mucous membranes of the mouth and rectum, and the peculiar stools, resemble the symptoms described in sprue. The patient had never been outside of the State of Michigan; therefore, if this was a case of sprue, it must have been sporadic, as he had never been associated with anybody having the symptoms of sprue.

Sprue has been reported in the United States. It was reported in the *Journal of Medical Sciences* in November, 1915 by Woods. Graham in 1905 reported four cases from the State of Georgia. Four cases were noted by Harris in 1907. One case was reported by Searcy in Alabama as a case of pellagra without skin symptoms. In 1902 Wood called attention to the diagnosis of sprue and pellagra observing that a great many cases of pellagra without skin symptoms were probably sprue. At the American Medical Association meeting in 1915 Hiatt and Allen reported a number of cases of sprue, one in North Carolina. Those who have written on sprue claim that it cannot be confused with any other disease. The symptoms are recurrent attacks of severe diarrhea, as many as thirty stools occurring a day, always frothy and yeast-like. There is a secondary anemia with stomatitis of the mouth and rectum and extreme emaciation. At autopsy the ulcerations are seen to extend throughout the gastro-intestinal tract.

The present patient with amebic dysentery came from Russia in 1905. He contracted his disease in the Russo-Japanese war, a very acute dysentery, at that time, which disappeared in six weeks. From time to time he has had recurrent attacks. In the past year it has become much worse and he has had ten to fifteen stools a day, which frequently contained blood and mucus. On examination of the stools numbers of very large motile amebae, many containing red blood cells, were found. I showed these amebae to Dr. LaRue who has been experimenting on non-pathogenic types in the

Department of Zoology. He said he had never seen as many amebae in a preparation as there were in these stools, there being from sixty to eighty in a field, associated with many trichomonads.

In this Clinic in the past five years there have been six cases of amebic dysentery, amebae being demonstrated in all cases. One was a case of lung abscess which had perforated. I have never seen a case with the exception of the case of lung abscess unassociated with trichomonads. There were three cases of trichomonad dysentery reported in this Clinic several years ago. Two of these cases have since proven to be amebic dysentery.

In one of our cases the man had dysentery over thirteen years. He had many trichomonads and we searched three days before we found one ameba, although I am not sure that it was a pathogenic form. Emetine completely cured this man. That was four years ago and I have seen the patient on several occasions, and he has never had any trouble since.

Any case of dysentery with trichomonads should be treated with emetine, it makes no difference whether the amebae are found or not. In a case of dysentery with amebae it is a matter of indifference whether they are pathogenic or not, the patient should be treated for amebic dysentery.

The results of the emetine treatment reported throughout the United States have been very encouraging. In the cases that we have treated we have had good results in all but two. One case was treated here for six weeks with very little improvement. He went home and has not returned. The other patient died and was autopsied.

It is interesting that Levy and Browntree of Johns Hopkins Hospital have reported two deaths and one patient with severe toxic symptoms with recovery following the use of emetine in doses which were rather large, about three or four grains a day. They examined preparations of emetine bought on the market at random and found that many dogs under moderate doses would develop severe diarrhea and finally succumb. Two of their patients died, one probably of uremia although he had been given emetine and showed some symptoms resembling emetine intoxication. The other was a woman who had a severe gastroenteritis but she finally recovered. Our patient had a very severe secondary anemia. He died probably of bronchopneumonia and acute dilitation of the heart. There was nothing in the gastrointestinal tract to suggest emetine intoxication. The large intestine showed amebic ulcerations and thickening.

DISCUSSION.

Dr. Quinton O. Gilbert: The case reported by Dr. Schmidt is very interesting because the amebae were so large, and fulfilled every requirement for entamebae histolytica, i. e., large size, rapid motility, differentiation of ectosarc, inclusion of erythrocytes and indistinct form of the nucleus. In the pathogenic forms, when motile, the nucleus is very indistinct and only as the organisms become quiescent can one definitely make out the pale chromatin bodies in the ring shaped nucleus. These were distinctly seen in this case.

Two years ago I had a patient at St. Joseph's Retreat who had amebic dysentery and the large pathogenic amebae were found as in this patient. It was a psychiatric patient, who had had a more or less persistent diarrhea for nine years, was a resident of Northern Ohio and had never been farther south than West Virginia.

Although we have had other cases of amebic dysentery in our Clinic, none of them showed the truly characteristic amebae except the patient reported by Dr. Schmidt at this time. In my patient the trichomonas intestinalis were present also in great numbers. This patient received three doses of neosalvarsan intravenously, which caused the amebae to disappear from the stools.

Dr. Udo J. Wile: It may be interesting to call attention to the fact that emetine enjoys some reputation as an efficient drug in the cure of pyorrhea. In this connection I know of one report by Dr. Engman of St. Louis in which a case of pyorrhea is described with amebae found in the gum and the case went on to very complete cure under the emetine treatment.

Dr. Victor C. Vaughan: I know nothing especially about amebic dysentery. I enjoyed Dr. Schmidt's paper very much. I believe that amebic dysentery is pretty widely distributed over the world. It was reported almost simultaneously along about 1878 by Lösh in St. Petersburg and by Kartulis in Cairo, Egypt.

Dr. James G. Van Zwaluwenburg: I would like to call attention to a case in this Hospital some years ago, in which the diagnosis of "sprue" was seriously entertained and my minority report has always been of that import. The patient was a missionary returning from China, the diagnosis of sprue had already been made in another hospital, and she afterwards died in still a third hospital as a case of sprue. However, this case is not listed here under that diagnosis.

In connection with the cases of amebiasis reported tonight, allow me to emphasize the fact that not all cases are imported. During my connection with the Clinic we had at least two cases that were strictly indigenous, both coming from Detroit.

A CASE OF ATONIC SENILE ECTROPION TREATED BY PLASTIC OPERATION.

GEORGE SLOCUM, M.D.
(From the Ophthalmologic Clinic, University Hospital, Ann Arbor, Michigan).

The case we have to bring before the Clinical Society is a long standing, senile ectropion of the flaccid type dating back some twelve or fourteen years. The patient comes to the Hospital for the removal of a senile cataract but its removal must be postponed until the lid has been restored to its normal position and the hypertrophic conjunctivitis cured.

Ectropion may result from several causes among which may be mentioned chronic hypertrophic conjunctivitis, a relaxed flaccid condition of the lower lid and cicatricial contraction from burns or wounds of the orbicular region. The operation decided upon will depend largely upon the type to which the ectropion belongs. As the flaccid type develops the lid margin drops away from the eyeball, the conjunctiva becomes inflamed from exposure, and the eyes fill with tears because the punctum no longer approximates the lacus lachrymalis. Long continued exposure results in marked hypertrophic changes and the lid turns more and more outward. Because of the nature of the etiology, palliative treatment is most unsatisfactory in this class of cases, although after operation it is usually necessary to use alum stick or some other astringent to stimulate absorption of the hypertrophic inflammatory products.

For cases with but little relaxation the simplest operation consists in making a row of cautery punctures parallel to and a short distance from the lid border; in the hypertrophic conjunctiva using for the purpose a pointed galvano cautery after the method advised by Ziegler. For the more pronounced cases a more radical procedure gives better results. The operation performed by Dr. Parker in this case was the Szymanowski-Kuhnt operation, also called the Dieffenbach-Kuhnt operation, though it would seem necessary if full credit is to be given that the name of Mueller should be added to the names of these three surgeons: Dieffenbach-Szymanowski-Kuhnt-Mueller operation.

The operation devised by Dieffenbach consisted in removing a triangular piece of skin from the neighborhood of the outer canthus. A cut was made horizontally outward long enough to equal the relaxation of the lower lid; a second cut was made from the external canthus straight downward and of about equal length; the distal ends of these incisions were then united and the included triangular piece of skin was removed. The skin of the outer half of the eyelid was next undermined and the lid severed from its attachment to the external canthal ligament; the lid was now sutured to the outer skin margin of the denuded triangle.

Szymanowski modified this procedure by making the first incision from the outer canthus up and out instead of directly out. The other steps were much the same. The improvement consists in a better elevation of the outer canthus.

Kuhnt's operation consisted in splitting the lid near its center from the intermarginal line deeply into the tarsus with a keratome. A triangular piece of conjunctiva and tarsus was then removed and the tarso-mucous margins brought together with sutures. This procedure leaves a rather unpleasant wrinkling of the loose skin to obviate which Mueller split the whole outer portion of the lid and distributed the loose skin above the lid border by properly placed sutures. The operation was finally perfected by taking out the tarso mucous wedge shaped piece as done by Kuhnt, splitting the lids as done by Mueller, and finally removing the triangular skin area from the area external to the canthus according to the Szymanowski-Dieffenbach procedure. This operation shortens both the tarso-mucous and the musculo-cutaneous layers without danger of notching the lid border, takes up the laxity of skin, supports the outer canthus, and approximates the punctum to the lacus, meeting all the requirements in a very satisfactory manner. It is obvious that caution should be used not to remove too large a piece of the tarso-mucous layer nor of the skin at the outer canthus. If on trial, too small a piece has been excised a larger piece can be removed before the sutures are placed. The central sutures are tied on the conjunctival surface. The split surfaces of the lid are held in apposition by a through and through suture near to, but not crossing the lid border and tied on the skin surface over a bead or roll of rubber protective. Two or three skin sutures usually serve at the outer margins of the denuded area.

The photograph taken before the operation does not show the extent of the deformity corrected, for the patient unfortunately looked down instead of straight ahead as he should have done when the picture was taken.

RESULTS AFTER PROSTATECTOMY.

IRA D. LOREE, M.D.

AND

R. W. KRAFT, M.D.

(From the Genito Urinary Clinic, University Hospital, Ann Arbor, Michigan).

During the fiscal school year of 1914-15 there were forty patients with senile hypertrophy of the prostate enrolled in the Genito Urinary Service. These patients were referred by the practitioners of the several states which contribute patients to the University Hospital. Because of the crowded condition of the Hospital fourteen of this number could not obtain beds. Two-thirds of these patients were farmers with limited means, and did not accept their physician's advice to seek surgical relief until their condition had, in most instances, become critical. Of the remaining twenty-six patients but one was refused operation. He had an enormously distended bladder when first examined. The functional kidney test (phenol-sulphonephthalein) for two hour sample of urine being too low for a reading, the routine procedure in such cases of estimating the urea content of the blood was carried out and found to be 3.50. This patient died in a uremic convulsion five days after admission. Extreme distention with its resulting serious kidney involvement is commonly encountered in this Clinic.

Out of the twenty-five patients who were operated upon, one died of pneumonia. The remaining twenty-four not only recovered from the operation but were satisfied with the results. The nearest approach to a permanent fistula occured in a patient who left the Hospital against advice. He returned five months later with tenesmus and inability to pass much urine per urethram. We removed a flat, oblong piece of organized tissue, probably a slough, which had occluded the orifice. Following its removal, the suprapubic opening quickly healed.

Two patients had been previously operated upon for removal of the gland by the perineal route. One of these, operated ten years before, had had a suprapubic incision made for drainage one year later. He had passed all his urine through this opening for nine years. The perineal operation upon the second man had been performed six years before without beneficial results. There were good-sized masses of prostatic tissue removed from each patient.

The material is of interest, not alone from the standpoint of the advanced ages of the patients, but because of the long time the disease had been allowed to run and the resulting complications. The average age of the patients was sixty-five years, the extremes being eighty and fifty-three years. Two-thirds of them were farmers. The average duration of the present trouble was six years. The extreme duration was thirty years, occurring in the oldest patient of the series, who made an uninterrupted recovery in thirty days.

The average length of time the patients remained in the Hospital after prostatectomy was thirty-one days. The shortest was sixteen days and the longest fifty-four days.

Through the courtesy of the Department of Internal Medicine, to which many of these patients are referred for expert physical findings, we are indebted for the following diagnoses in some of these patients:

Arteriosclerosis with senility.

Chronic interstitial nephritis with cardiac hypertrophy.

Persistent irregular pulse with pulmonary tuberculosis.

Hemiplegia with brain softening.

One interesting case referred to this service from the Psychopathic Hospital with a diagnosis of senile dementia, epilepsy and hemiplegia, was successfully operated upon and returned to that service. The medical findings were myocarditis, nephritis and emphysema with irregular pulse. The patient was cyanotic, dyspneic and weighed two hundred and twenty pounds.

A positive history of gonorrhea was obtained only in one case. A positive history of some hematogenous infection was obtained in every case. Merely suggestive is the fact that three-fourths of the patients gave a history of typhoid fever, typhoid malaria, or rheumatic fever. It will be of special interest to determine during the following years the importance of the above observation. Not a single case of carcinoma of the prostate, in another series, gave a history of typhoid. Only five patients used tobacco or intoxicants, both being suggested at one time, as etiologic factors.

We insist upon the history of these patients including, beside the usual symptomatology, the record of a complete physical examination; blood examination; blood pressure and a Was sermann. In parenthesis, it is of interest to know that in patients of advanced age the Wassermann is of little value. It may be negative on the blood of such a patient with an active gummatous lesion of the nose, a definite C. N. S. lues, and positive spinal fluid. Residual urine is carefully recorded unless abdominal palpation indicates overdistention, in which case five to six ounces of urine are allowed to flow out

through an indwelling catheter every hour until the bladder is emptied. We have discontinued the routine use of the permanent catheter unless the time for operation is delayed for a few days after the patient enters the Hospital.

If digital examination per rectum reveals little or no enlargement in a suspected case, cystoscopic examination is made to detect, if possible, the presence of a median lobe or a fibrous ring. When the functional kidney test is below 10 per cent. for two hours, ten cubic centimeters of blood are withdrawn and an estimation is made of its urea content.

The two stage suprapubic prostatectomy is alone employed in this Clinic, the preliminary cystotomy being performed under 2 per cent. novocain anesthesia. After opening the bladder, digital examination of its walls and the prostate is made, after which a good-sized rubber tube drain is inserted and the bladder wall stitched tightly about it. We consider this a much more efficacious method of drainage than a permanent catheter per urethram or one placed by means of the trochar and canula. The urine drains into a bottle placed in a pocket on the patient's abdominal bandage, and he is up and about the day following the operation. The patient's appetite, dry tongue and general condition improve rapidly after the above procedure. However, in but one case was there an increase in the phenol-sulphonephthalein output.

The time for the second operation depends upon the rapidity of improvement. In the majority of the patients of this series it was performed at the end of one week. One patient was kept six weeks before it was deemed advisable to subject him to the strain of the second operation. Under gas-oxygen anesthesia the finger is pushed into the bladder through the old incision and the gland is enucleated. A Hagner bag is then introduced to control hemorrhage, and after its removal, at the end of twenty-four to thirty-six hours, a large-sized soft rubber catheter is inserted into the bladder. After the stitches are removed the wound is held tightly about the catheter with gauze and collodion. The first requisite in the postoperative care is to keep the patient dry. This is made possible in 98 per cent. of cases, by dressing them daily with renewal of the gauze and collodion as they begin to loosen.

DISCUSSION.

Dr. Ira D. Loree: The increase in the number of old men coming to the Hospital for senile hypertrophy of the prostate is probably in ratio with the increase in the other services of the Hospital. About ten years ago when Dr. Ferguson of Chicago, who is now dead, came to Ann Arbor to address one of the local societies, he told me that he had performed eighteen operations for senile hypertrophy with one death. This was at that time quite an enviable record. There had been only two or three prostatectomies performed in Ann Arbor at that time to my knowledge.

One of the objects of Dr. Kraft's paper as you probably well understand is to show you the class of patients we have coming here with this trouble. I don't believe any Clinic in this country has a class of patients with more complications or any poorer risks. Much of the credit of the success of this series is due to Dr. Kraft because he had the after care and that has a great deal to do with getting them well.. His watchword was to keep them dry. We mean here by keeping them dry to keep them dry twenty-four hours of the day. Dr. Kraft's work would be better appreciated if you would go into some of the clinics not only in this country, but abroad, and see how these poor patients wallow in urine soaked dressings and bed clothing. As Dr. Kraft has well said, we kept 98 per cent. of them dry all the time.

Dr. Harry Malejan: I would like to say a few words about the double stage operation. About three or four days after performing the first stage of the operation under local anesthesia the patient, as a rule, shows beginning symptoms of uremia. The urinary output diminishes to 500-700 cubic centimeters. The phthalein content drops to 15-20 per cent. and the urine boils solid with albumin. The tongue of the patient is dry, parched, and the temperature subnormal. The patient has anorexia and is apathetic. The peculiar balance existing in the nervous control of the secretion of urine, kidney and heart is disturbed. This condition lasts four or five days, then there is more copious secretion of urine, the phthalein output is increased, less albumin occurs in the urine, and the patient's general condition improves, and he is ready for the second operation. In our Clinic since I have been here I believe our mortality has decreased due to the double stage operation.

Dr. Harry B. Schmidt: I have seen a number of Dr. Loree's cases referred for medical examination and I should say that a good 50 per cent. are lucky to be alive when they reach the Hospital.. When they tell me they are going to have their prostates removed, I am greatly surprised. It is a wonder to me that half of them recover.

Dr. Rollan Kraft: One of the most interesting things is the etiology which naturally cropped up in going over the histories. Three-fourths of the patients show a hematogenous infection at some time. This has been noted by other observers. These infections were diagnosed rheumatic fever, typhoid fever, malaria, etc., but all of them may have been typhoid. I thought that during the coming year it would be interesting to try Widals on these patients.

Dr. Harry B. Schmidt: Most of these cases have hypertension and show uremia and nephritis.. Do the majority of these cases have true chronic interstitial nephritis or is it an old ascending pyelitis?

Dr. Ira D. Loree: Most of them are secondary conditions from the bladder, I believe.

ALFRED FOURNIER—AN APPRECIATION.

WARREN T. VAUGHAN, M.D.

In the death of Jean Alfred Fournier, who died in Paris in December, 1914, we have lost one of the greatest of modern scientific clinicians. Although a broad man and well versed in the various branches of medicine, he devoted particular attention even from the time of his internship to the study of syphilis in its various phases. His broad clinical experience combined with his remarkable ability to differentiate the various pathologic processes enabled him to recognize an unsuspected syphilis as the etiologic factor in various diseases previously not classed as syphilitic.

In his teachings, Fournier insisted upon the duality of chancre and chancroid. He was the first to assert the etiologic relationship between gonorrhea and rheumatism. He described spontaneous or metastatic gonorrheal conjunctivitis, not resulting from external transportation. He was the first to make the claim that tabes and paresis were of specific origin. In fact he created an entirely new class of syphilids, the "parasyphilids," morbid conditions which are often if not always specific or heredospecific in origin, but which clinically do not appear syphilitic. These conditions have two characteristics, first, that they can occur without any luetic signs whatsoever, and second, they are relatively uninfluenced by mercury and iodine.

Included within this category were pigmentary syphilids, neurasthenia, hysteria, tabes, general paralysis, epilepsy, certain progressive amyotrophies, hereditary dystrophies, hydrocephalus, Little's disease, and leukoplakia buccalis. He also suggested the occasional luetic etiology of diabetes, hemoglobinuria, certain tertiary erythemas, and a variety of alopecia. It is now an established fact that pancreatic syphilis tends to be associated with glycosuria.

It was this directing idea that syphilis was ubiquitous, which led to Fournier's numerous surprising discoveries.

From the beginning of his career he had the habit in his extensive private practice, of jotting down a note at each visit of each one of his patients. He thus accumulated a veritable pathologic museum. Concerning this he has said, "I have made myself a collector in syphilis just as fancy or curiosity invite others to become collectors of pictures, of books, of trinkets, of autographs, of snuff boxes. It is thanks to these notes that I have been able to first convince myself, and then convince my colleagues of the pathogenic relationship between syphilis, general paralysis, leukoplakia, and the heredospecific dystrophies.

Perhaps his greatest title to renown lies in his theories concerning hereditary syphilis. In his "Latent Hereditary Syphilis" published in 1886, he described with precision the stigmata of heredosyphilis, the cranial bosses, saddle back nose, sabre shin, and the typical alterations in permanent teeth. He also suggested the possibility of heredosyphilis affecting the second generation, a view which today is receiving much study.

A most important contribution was Fournier's "Syphilis Secondaire Tardive," in which he demonstrated that luetic subjects in the tertiary stage might, contrary to the rule, transmit the disease even as long as ten years post infectionem. This is accounted for by the recurrence of late secondary manifestations, which may be roseolaform, or papulosquamous lesions on the palms and the plantar surfaces, or mucous patches, which occur especially on the buccal and genital mucosae. These he demonstrated to be contagious ten years after infection, and occasionally as long as thirty years after. The etiology of these recurrences is to be sought according to him in insufficient treatment. The danger from such cases is apparent.

His "Treatment of Syphilis," which first appeared in 1893, contained essentially everything that is known thereof today, with the exception of but two things, salvarsan and the spirochaeta pallida. It has well been said that Fournier was twenty-five years ahead of the rest of the medical profession. In this book he makes a strong plea for the treatment of syphilis no longer as a venereal disease, but as a social problem, and clinically as a chronic systemic infection.

He remarks as follows:

"What we learn at the hospital is the treatment of certain syphilitic lesions: but this is not the treatment of syphilis. It is not the treatment of syphilis as a diathesis—as a chronic disease requiring prolonged treatment of several years duration. This is because at the hospital we only have to treat the "episodes" of syphilis, if I may use the term; because, when hardly cured, or even only relieved of their actual lesions, patients hasten to leave and disappear. To treat syphilis is not only to attack and cure the manifestations of a day, or even of a period; it is also and especially to attack the disease as a whole—to attack it when patent and latent; to lay hold of its primary

cause. It is to institute with this object a treatment of long duration, almost chronic, which alone is sufficient to realize preventive effects."

He thus became the exponent of the interrupted treatment, as against the previously practised treatment of acute symptoms, only, and suggested his "Chronic Intermittent Treatment," biennial courses throughout a period of five or ten years, with the object of sterilizing the disease in its incipiency and then preventing its later accidents and its transmission to descendants. He has consequently very little patience with the abortive treatment of chancre, which consisted in the dissection of the glands, cauterization, and excision of the primary lesion. His views are well given in the following quotation:

"Langston Parker cauterized a chancre of only two hours duration, without preventing constitutional infection. Another case is reported concerning a man who ruptured his frenum during sexual intercourse. This was cauterized eleven hours afterwards with fuming nitric acid. The wound healed, but a month later the cicatrix became indurated, and secondary symptoms followed. Cauterization of a syphilitic chancre even in its earliest stage, is absolutely powerless to prevent constitutional infection.

"A young man had a slight abrasion of the prepuce after coitus. A few days afterwards he learned on good authority that the woman with whom he had connection had recently communicated syphilis to two of his friends. The next day circumcision was performed, and nothing happened for more than two months except slight glandular swelling, which was attributed to inflammatory reaction. Then a roseola appeared, soon followed by divers secondary symptoms, for which I treated him.

"Even if we amputated the penis as soon as the chancre appeared, syphilis would none the less certainly follow."

Incomparable as a diagnostician, the most advanced in methods of treatment, Fournier also directed his attention to the problem of prevention. He saw the grave dangers to society from the rapidly spreading disease, and he was foremost in instigation of prophylactic measures. He it was who founded the "French Society for Sanitary and Moral Prophylaxis," "a league against syphilis," an institution which has since become international.

In his lectures on "Syphilis and Marriage," he remarks:

"It will happen to you often, gentlemen, in the course of your practice, to see a patient, known or unknown to you present himself in your office, who, with countenance preoccupied, almost anxious, will address you as follows: 'Doctor, I am contemplating marriage. I have not always been discreet in my bachelor life, and what is worse, I have not always been fortunate. I contracted syphilis at such a time. I have had such and such accidents. I have been treated in such and such a manner. The matter is now a serious one to me. I have come to ask you if I am thoroughly cured and if I can, without danger for my wife, without danger for my prospective children contract the union which I propose.'

"Now when such a request is addressed to you, gentlemen, do not misapprehend the gravity of the situation. Your response involves interests the most serious, the most sacred, the most dear to the heart of every honorable man, of every respectable family, as well as interests the most diverse and the most multiplied. By this opinion which you are about to formulate, you incur a responsibility which I can not otherwise characterize than as considerable; and I do not think I exaggerate in saying that in the province of the physician there are few problems to solve on the one hand so grave, and on the other hand so complex, so difficult, so delicate, as this.

"Take my word for it, gentlemen, I have witnessed many scenes, many dramas of this kind, and I declare I know of no position more heart rending, more lamentable, more atrocious, than that of a man who has introduced the pox into his little household; than the situation of this man, first in regard to his disconsolate, weeping wife, whose tears are not even accompanied with recriminations, or complaints, for love and affection readily forgive; second, in regard to a new family that will not pardon, that has the right to be severe, and exercises that right; third, in regard to the infant, which miserably vegetates, and instead of being the beautiful child dreamed of by the relatives and the mother, is to everyone, even to the nearest of kin, but an object of disgust and horror; fourth, finally, in regard to an infected nurse, who threatens, who makes scandal, who divulges, who throws disgrace upon the family. Picture to yourselves such a scene, gentlemen, and judge of the regret, of the martyrdom of the man who has caused such afflictions.

"If it is not the province of men of the world and of patients to know what the effects of the pox not treated may be, after a long

interval, it is our province to know this, and to instruct those who are ignorant. It is our mission to divert from marriage every patient who presents himself to us with a syphilis, insufficiently treated; to dissuade him from it, to his own great advantage and to the great advantage of others, and to say to him, with the authority of our conscience and our character; 'No, sir, no, it is not allowable, in your present condition for you to dream of marriage. Until now, you have thought it best to live with the pox, to preserve the pox. That was your right, and no one had anything to say, for you were single, and consequently alone liable for your imprudence. But now, since you aspire to marriage, the situation becomes very different. To marry is to have charge of lives, and since you do me the honor to consult me, you make it my duty to remind you that you have not the moral right to associate others in your personal risks—that is to say, to make a wife and children share the possible consequences of your disease.' "

This accompanies a most instructive treatise on syphilis in the family, and the physician's conduct therein. In the same book he considers the relations of syphilis to the wet nurse, and does not fail to emphasize the importance of the physician's refusing to allow a healthy nurse to suckle a syphilitic child. The most distressing example of failure to adhere to this rule, he quotes as follows: "A syphilitic child infects its nurse. This nurse, in order to empty her breast, suckles three nurslings, all three of which take syphilis. Each of these children infects its mother; each of these three mothers infects her husband. Count: ten syphilitic contaminations derived par ricochet from the syphilis of a nursling. And do they stop here?"

In his efforts to prevent syphilis in the locality wherein it is most frequently contracted, namely in the brothel, Fournier endeavored, through his "League Against Syphilis," to pass administrative measures in harmony with the following principles:

First, that prostitution creates a public danger, by the venereal contagion which it spreads among the community.

Second, that prostitution should be supervised, and if possible suppressed by the public authorities.

Third, that the system of free and nonsupervised prostitution is disastrous to the public health.

Fourth, that public solicitation, which forms the only external sign by which prostitution can be legally attacked, should be suppressed in all its forms.

He suggests the following measures for the control of prostitution:

1. "In the interest of public health, women recognized as guilty of public solicitation should be submitted to periodic medical examination.

2. "Those women who are found by this examination to be affected with venereal disease, especially syphilis, should be confined to a special venereal hospital.

3. "Registered women should be uniformly submitted to a weekly visit at a fixed date; also a supplementary surprise visit, which should be made monthly by a medical inspector.

4. "Each of these visits should be complete, and be directed chiefly to examination of the genital organs and the mouth.

5. "The special hospitals for prostitutes, the consultations, and the medicines should be gratuitous."

This altruistic work was, of course, opposed by many, so called "prudes," on the grounds that it interfered with the liberty of the women under consideration, it made of them slaves, domestic animals. Also, that it interfered with the course of justice; syphilis being a merited disease, those who subjected themselves to the possibility of infection were but receiving their just deserts. Further, that eradication of syphilis would remove all restraint from venerey, and that the disease should therefore be cherished, and carefully protected from extermination.

It is interesting to examine a few of Fournier's replies to these criticisms:

"This austere and unjust doctrine would take us several centuries backwards to the good old times, when syphilis was regarded as a well merited expiation, as a chastisement inflicted on sinners by the Divine wrath; when, in the hospitals for patients affected with the 'Great Pox,' as it was then called, a good beating constituted the whole treatment of the disease,—a method which had only an indifferent therapeutic effect.

"It does not recognize hereditary syphilis, syphilis in married women, syphilis of wet nurses, and sucklings, professional syphilis, domestic syphilis, accidental syphilis, etc. Let us ask these rigid moralists, how many men of our day are there who have not exposed themselevs to the risk of contracting syphilis, and 'merited' it, at any rate, once, in their lives? In truth, if those only, who are absolutely 'without sin' were authorized to 'cast the first stone,' at the unfortunate syphilitics, I should

have little fear of the effect of the stoning on our patients.

"One of my patients, a respectable married man, after a dinner with some college friends, visited a brothel in Paris, 'out of curiosity.' Having several glasses of champagne too much in his head, he allowed himself to be led astray, and contracted syphilis, which he soon communicated to his wife.

"It is thus that syphilis often passes from the garret to the palace, from the lowest brothel to the virtuous woman's boudoir, and even to the child's cradle. Therefore, there is no hearth that can be indifferent to the prevention of syphilis. To cleanse the brothel is not only to protect those who frequent it; it is also to protect the family hearth, the honest woman, the child, and the race.

"The interference and regulation by the police, has been denounced as constituting an abuse of power, and even a violation of individual liberty. I confess that the liberty to give syphilis to the passers-by on the public thoroughfares seems to be as little rational as giving liberty to a mad dog.

"Let us, by good sense, enlightened by clinical experience, confer on society the right, I might even say the obligation, to defend itself against the terrible plague of venereal affections, and this I repeat, in the name of the sacred interests of the virtuous woman, the child, the family, and the country."

After a prolonged illness which had gradually robbed him of his health, and of his former marvellous keenness of thought, Jean Alfred Fournier died in December, 1914, very happily having been spared in his last days a clear consciousness of the tragic events that were happening in the field of battle about him.

If I have succeeded in imparting to you a portion of the enthusiasm, and the pleasure that I have experienced in the reading of the works of Alfred Fournier, let me close with this eulogy to him, written by one of his German confrères, since the onset of the present war.

"The news of the death of our great preceptor, fills us with deepest emotion. Our beloved teacher has left this earth to enjoy a deserved peace in the celestial fields. His abode, yonder must be one of the most beautiful, for his life on this earth was most fruitful for our science, and for all mankind. But we must content ourselves with his great works, which remain to us that we may still derive benefit therefrom."

DISCUSSION.

Dr. Udo J. Wile: Those of us who had the opportunity of listening to the life of Jonathan Hutchinson must be struck with the contrast between the lives of these two men. In the case of Hutchinson, a man who did his best work up to middle life. After that the infirmities of age came on him very rapidly and although he maintained his reputation to the last, it is sad to note that he held some theories which were ridiculous, for instance, the contagiousness of leprosy from the eating of bad fish, and the identity of yaws with syphilis. In the case of Fournier, up to the very last years of his life, a man well over 80, of a leontine type, extremely fresh manner and as impressive in his manner as he must have been when a young man. His book, Le Traitè de la Syphilis is still the only text which we have and that book, although it does not include the spirochete or the salvarsan treatment, is still admirably adapted to the student.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, June 7, 1916

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

REPORT OF A CASE OF HYDROCEPHALUS WITH SPINABIFIDA AND COMPLETE SITUS INVERSUS.

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The case I wish to report tonight, is of interest from several viewpoints. Its principal obstetric importance comes from the relative rarity of forehead presentations, but the associated malformations which the fetus exhibited are also well worth consideration.

Primary forehead presentations, or those due to factors operative during pregnancy are very rare, because, if deflexion of the head has proceeded thus far, labor usually produces full deflexion and we have either a brow or face presentation to deal with. The case which is to follow is one of secondary forehead presentation occurring after the onset of labor and for which the etiologic factor was first definitely determined upon vaginal examination. This type of presentation, when persistent, becomes as formidable as persistent brow cases, spontaneous delivery being practically impossible if the fetus is of normal size and development.

A. S., primipara, age 22 years, single, entered the Obstetric Clinic January 12, 1916. Her family history was entirely negative for any chronic or hereditary disease. Her personal history was also unimportant, as she had always been well aside from the usual children's diseases. No history of lues or Neisser infection could be obtained. She menstruated first at the age of twelve years and her periods had always been regular and normal. No constitutional symptoms were present. Her last period began May 24, 1915, and was of the usual duration. She had had no show since. A definite history of coitus occurring June 1, was, however, obtained and accordingly her expected labor was set for March 8, 1916. The pregnancy thus far had been uneventful. Examination showed the patient of moderate frame and of good general nutrition. The heart and lungs were negative. Abdominal examination showed her pregnancy advanced about seven and a half months; the fetus was apparently of normal size, presenting in occiput right transverse position and was active. Pelvic measurements were large, interspinous diameter measuring 27 cm.; intercristal 29.25 cm.; external conjugate 20 cm.; tubers 9.5 cm.; diagonal conjugate not reached. Vaginal examination was entirely negative and ballottement of the fetus was obtained. No physical findings at all suggestive of lues were noted.

Labor.—The patient first began to have definite contractions about 10 p. m. March 7, and was accordingly prepared for labor. When examined at 3 a. m. the findings were as follows: Breech in the fundus; back on the right, poorly felt below the umbilicus, and on deep palpation felt near the midline extending partly on the right and partly on the left. The small parts were in the left upper abdomen; head in the pelvis, well fixed, with the cephalic prominence on the right side and definite. The fetal heart sounds were best heard on the right side, below the umbilicus, near the midline and were normal. Rectal examination showed the cervix dilated to about 3 cm. with the membranes intact. Directly over and within the cervical rim could be very distinctly palpated the large anterior fontanelle. Uterine contractions were occurring every three or four minutes, each lasting forty-five to sixty seconds. Examination at 8 a. m. gave practically the same abdominal findings, except that the back was more easily

felt in the lower right midline. The fundus was high with the breech reaching almost to the ensiform. The fetal heart tones were now heard best in the middle and to the left. The cephalic prominence was also more marked on the right than at the previous examination. Rectal examination showed that no descent had occurred, and the anterior fontanelle was still distinctly palpable. This seemed larger and more definite than normal. With these findings, a diagnosis of partial extension of the head, that is, forehead presentation was made. The cervix was dilated about 4 to 5 cm. with the membranes still unruptured. Contractions were occurring regularly, every three minutes, of good quality, and with increasing severity. Examination at 11:30 a. m. showed the same findings. On rectal examination the head was still felt well above the spine and the cervix half dilated. During each contraction the large fontanelle seemed to recede towards the right and posterior, as though the head was attempting further extension.

Upon consideration of the fact that the patient had been in active labor for approximately fifteen hours with strong uterine contractions throughout, that the head had not descended and was tending towards further extension, it was decided to interfere. She was put upon the table at 12:45 p. m. and prepared for delivery. Vaginal examination confirmed the previous findings, except that the cervix was found nearly fully dilated and very soft. The bones of the fetal head were felt to be very loose and movable and the anterior fontanelle very large. No distinct crepitation was observed, but the feel was more like that of a macerated skull. The fetal heart rate was ascertained to be 124. A probable diagnosis of moderate hydrocephalus was now made. The membranes were ruptured artificially and a moderate amount of greenish amniotic fluid drained away, no hydramnios being present. The fetal head was found to be lying in occiput right transverse position, partly extended with the large fontanelle the most dependent portion. The sutures were observed to be easily palpable and somewhat widely separated. With the hand inside the cervix the head was flexed and the occiput rotated manually anteriorly to the symphysis, and held in that position by abdominal pressure, while forceps were applied. The fetal heart at this time became somewhat rapid, about 160 per minute. Moderate traction was carefully made by forceps following which the fetal heart gradually slowed. Examination after the forceps were loosened showed a prolapsed cord. This was replaced manually and traction again carefully attempted. No advance of the head was obtained and it was not deemed advisable to use forceful traction. The fetal heart tones could no longer be obtained. Craniotomy was, therefore, decided upon. The forceps blades were left on, the scissors introduced through the sagittal suture, posterior to the anterior fontanelle and the meninges perforated. Immediately there was a gush of clear fluid, as though a second amniotic sac had been ruptured. Considerable brain substance also drained away. Careful traction with the forceps now produced steady advance of the head and the latter was delivered easily at 1:40 p. m. The third stage of labor was practically normal, except that the uterus remained rather atonic and it was found necessary to remove the placenta manually from the lower segment. The membranes were practically intact and showed no evidence of an interrupted twin pregnancy. There was a slight second degree laceration, which was immediately repaired. The patient then received a hot intrauterine douche before being carried to the ward.

Examination of the fetus showed it to be a female, 53 cm. in length, fully developed and weighing about seven and one-half pounds. The head was distinctly globular in shape and large, even after the evacuation of fluid measuring as follows: occipitofrontal circumference 35 cm.; bitemporal diameter 9 cm.; biparietal diameter 10.5 cm.; suboccipitobregmatic circumference 34 cm. The temporal fossae were obliterated. These facts bore out our previous diagnosis of moderate hydrocephalus, even though the features of the fetus were not distinctly hydrocephalic. The skull bones were rather thick accounting for the fact that no definite crepitation was obtained.

There was also present in the lumbosacral region a spinabifida with the skin and membranes of the cord intact, but reddened and thinner than normal. On autopsy another very interesting condition was discovered, namely, a complete situs inversus, characterized by dextrocardia, large lobe of liver, gallbladder and appendix on the left side of abdomen, spleen and stomach on the right, and the sigmoid dipping down into the pelvis along the right sacroiliac synchondrosis. The pelvic organs and external genitalia were normal.

On looking over the literature I find that in a curiously large number of cases the sex of malformations is female. This is particularly true of double monsters. Very frequently malformations are combined in the most curious

ways. Whether this is a purely accidental occurrence or a definite relationship cannot be said, although Schwalbe states that some French writers have discovered definite laws with regard to such occurrences.

Hydrocephalus is usually explained by an excessive secretion from the ependymal cells of the choroid plexus. The amount of fluid varies from moderate amounts up to five liters or more. As to the etiology, Ballantyne believes that antenatal hydrocephalus is due to an embryologic arrest of development to which may be superadded in the fetal period a disease affecting the malformed parts. It may also arise in postnatal life without a preexisting malformation in the fetal epoch, as a consequence of birth injury, tumors, meningitis, etc. Causes of the antenatal type are thought to be chronic alcoholism, syphilis, trauma or any fetal meningitis. Of 362 cases of hereditary lues studied by Hochsinger, thirty-four were hydrocephalic. Maternal infections, as smallpox, influenza, syphilis or tuberculosis may also play a part in the etiology. Hydrocephalus often recurs in the successive children born to one mother, and is often associated with other malformations, as microcephalus, encephalocele, spinabifida, clubfoot, ascites and hydramnios. Of sixty cases reported by Von Winkel, eighteen showed spinabifida. Among the sixty there were also five cases of double clubfoot, two of ascites, and three of hydramnios. Of 330 cases of spinabifida reported by Schwalbe, forty-one were accompanied by hydrocephalus.

The characteristics of a hydrocephalic head are its globular shape, thin skull bones, translucent and displaced outward, small face and eyes displaced downward and forward. The body is smaller, as a rule, although in some cases, as the one reported tonight the fetus may be otherwise well developed and of good size.

The occurrence of this condition varies a great deal according to the literature. In the Göttingen Clinic, there were eight cases in 4,200 deliveries, or a ratio of one to 525 births. Schuchard reports sixteen cases in 12,055 deliveries, or a ratio of one to 753. Kleinhans reports seven cases occurring in 11,254 deliveries, or a ratio of one to 1,600. Von Winkel reports eight cases in 15,000 deliveries, or a ratio of one to 1,875 deliveries.

The course of labor is premature in a large percentage of cases. If at term, the course depends upon the size of the fetal head. Spontaneous birth of a hydrocephalic child is only possible when it is of a slight, or at the best, of a medium degree of severity. In the higher grades this can only occur if the fetus is already dead or macerated, or if the hydrocephalus burst spontaneously. Such a rupture has been observed most frequently in breech presentations. The presentation is cephalic in a majority of cases of hydrocephalus, although pelvic presentations are frequently observed, occurring in about 29 per cent. of cases. Cephalic presentation occurred sixteen times out of twenty-two cases reported from the Königsberg Clinic by Hammerschlag. Of twenty-two cases reported by Hohl, sixty-two were cephalic and fifteen pelvic presentations. Almost all the cases running an unfavorable course for the mother are those in which the hydrocephalus presents by the head, due to the fact that the lower uterine segment is more easily thinned out in this type of presentation, and progress is much slower, if it occurs at all. Spontaneous birth of the hydrocephalic head occurs more easily in breech cases. The variety of presentation of the head is also of importance in regard to the progress of labor. If the head engages in the pelvis with its greatest occipitofrontal diameter, that is, brow presentation, it is much more unfavorable than when it is markedly flexed and occupying an oblique diameter, when molding can occur. Clinically, the fact has been well established that it is not the most marked forms of hydrocephalus which give rise to the greatest difficulties during delivery, for these may mold sufficiently or burst spontaneously but the moderate degrees cause marked dystocia.

How often interference during labor is necessary in cases of hydrocephalus, the statistics of Hohl and Schuchard demonstrate. Of seventy-seven cases collected by Hohl, artificial aid was necessary for the termination of labor in sixty-three. Of seventy-three cases reported by Schuchard, there was interference in sixty-two. Of seven cases in the Prague Clinic, and nine cases reported by Veit, artificial delivery had to be used on each occasion.

Prognosis.—The importance of this complication is very evident from the following statistics. Of Hohl's seventy-seven mothers, twenty-one died. Of Schuchard's seventy-three, thirteen died. Of Veit's nine, four died. The primary cause of death was in most cases rupture of the uterus, accompanied also frequently by severe lacerations, urinary fistulae and sepsis, all of which result from the long, difficult labors, repeated examinations and the necessary operative interference. Of late, due to better asepsis, the prognosis has improved. In thirty cases

reported by Hoffman and Bertino, only two mothers died. Of eight cases in the Breslau Clinic, and eight in the Göttingen Clinic, there were no maternal deaths.

The fetal prognosis, however, is much worse. Intrauterine death occurs frequently. A large number die at or shortly after birth from the interference which the condition necessitates. Following tapping or perforation in some cases the disease is arrested and development proceeds. This outcome is rare and most children succumb in the first year to intercurrent disease or the primary trouble. Treatment of such cases as have survived in a thankless task, although temporary results do at times follow repeated lumbar puncture and antiluetic treatment. Of Schuchard's seventy-three cases where six children were born alive, one who was tapped lived six weeks. Hoffman in 1902 reported eleven cases with three children born alive. Of these two were tapped; one died immediately after birth, and the other after seven hours. In the seven cases of the Prague Clinic, the children were all stillborn.

The diagnosis of hydrocephalus during labor is not often made. In some the diagnosis is very difficult, especially in the moderate cases and where there is but little amniotic fluid. An excessively large abdomen with the head remaining unengaged above the bony inlet after good pains are present is very suggestive of hydrocephalus, provided the pelvis is normal. The parchment like crepitation of the bones of the skull said to be pathognomonic of hydrocephalus can rarely be obtained by abdominal palpation. It is more easily obtained by vaginal examination, at which time one may also note that the sutures are wide and gaping and the fontanelles large and bulging. On the other hand, cases of hydrocephalus also occur, where the skull bones are not thinned but thickened, and where no crepitation is obtained. Absence of ballottement of the fetal head and rapid fetal heart rate are at times suggestive of the diagnosis. Mistakes in diagnosis are frequent, as when hydrocephalus is falsely diagnosed as exencephalus, hernia cerebri, tumors of the breech, fetal maceration, etc. A correct diagnosis can, however, always be made by bimanual examination under anesthesia.

The treatment of this condition varies. Fritsch advises perforation of the skull with Smellie's scissors when the cervix is sufficiently dilated whether the fetus is alive or dead, followed by manual extraction. Other authors pay more attention to the life of the child in view of the fact that it is quite possible for a hydrocephalic child to remain alive after birth, even becoming cured. The use of forceps in a case of hydrocephalus is entirely rejected by some authors for the reason that the danger of slipping is too great, but conservative application is usually considered good treatment. Ahlfeld, Küstner, Von Winkel, and Olshausen recommend diminution in size of the skull by puncture with a fine trocar about six millimeters in diameter. The further progress of the delivery is then left to nature. Care is taken when the trocar is inserted not to injure the cerebral sinuses. If the child is dead, or dies later, perforation is carried out or the puncture wound enlarged and the cranioclast is employed in case expression or manual extraction is impossible. Puncture is of little value in the treatment of the aftercoming hydrocephalic head in a breech case, the child usually dying in the interim. Here perforation need only be considered, the instrument being inserted through the lateral fontanelle, foramen magnum, hard palate, etc. If the head is high up, the spinal method of Von Huevel may be used. In this method the lower cervical or dorsal portion of the spinal column is divided, the spinal canal opened and a female catheter introduced into the cranial cavity and the fluid evacuated. If spinafida be also present, it may be opened and the catheter pushed into the spinal canal. Version for delivery of a hydrocephalic child is to be regarded as distinctly contraindicated by reason of the great danger of uterine rupture.

The question may be raised as to whether there has not been too much regard paid to the life of the child. A hydrocephalus tapped during delivery and continuing to live is a great rarity. Indeed, Spiegelburg was unable to find a single case in the literature. In most cases, even when tapped, the condition tends to increase after birth with progressive idiocy and ultimate death. With these facts before us, it seems perhaps that the most rational treatment of such cases during labor is perforation with expression, manual extraction, or the use of the cranioclast to complete the delivery. A much better maternal prognosis could then be given.

Spinabifida occurs with about the same frequency as hydrocephalus. According to Chaussier and Denne, the frequency is about one in 500 to 1,000 cases. The fetal prognosis is also very poor, most of the children dying the first year after birth. According to Biedert of thirty-two cases, twenty-five died in the first week after birth. Some cases do recover following surgical treatment, leaving, however, a total

mortality of at least 50 per cent. The course of labor is usually not affected by spinabifida unless it is of the cystic type, and presentation is usually cephalic.

The remaining malformation, complete situs inversus, will not be discussed in this paper. Its rarity is assurred when Kerr in reporting 10,000 autopsies covering a period of ten years states that he saw only two cases of this condition. Bland Sutton reports one case in 3,000 abdominal sections.

The etiology of the condition is not understood. It is probably due to an inherent condition in the fertilized ovum, although Schwalbe mentions a theory that it may perhaps be explained by uniovluar twin pregnancy with the early death of one fetus, the fetus which goes on to development being the mirror image of the other. Should this be the explanation we would expect to find evidences of the early multiple pregnancy in the fetal and maternal membranes.

In conclusion I wish to state that no etiologic factor has as yet been discovered for any of the malformations present in this case. History, physical examination, and Wassermann of the mother were negative. The Wassermann taken on blood, obtained from the cord at the time of delivery, and microscopic examination of the placenta were negative. There was, however, a small tumor formation removed from the under surface of the liver of the fetus, which suggested a gummatous formation. The complete pathologic report has not yet been made. We, therefore, cannot definitely rule out lues or some other fetal meningitis, or disease. The further report of this case from the standpoint of situs inversus, will probably be made later by the Pathological Department. The mother made an entirely uneventful convalescence and was discharged from the Hospital in good condition.

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DISCUSSION.

Dr. Reuben Peterson: The diagnosis of hydrocephalus is difficult in most cases, except where the accumulation of fluid within the fetal skull is considerable. Even here the condition may be mistaken for some other condition, since the large size of the head makes palpation from below difficult, as the head is apt to remain high up in the pelvis. The diagnosis is less difficult in moderate degrees of hydrocephalus such as in this case where the bones of the fetal skull were distinctly separated and quite movable.

We were very careful in the application of the forceps, bearing in mind the danger of slipping in such a condition. Excessive traction was also avoided since hydrocephalus is notable for its tendency towards a thinning of the lower uterine segment after some hours of labor. Many cases of uterine rupture have followed the injudicious use of forceps in these cases.

After the prolapse and replacement of the cord and the death of the fetus I did not hesitate to perform craniotomy since it was clearly indicated and easily performed. It is a most unsurgical procedure and poor obstetrics to attempt to pull the large head of a dead child through the pelvis and soft parts of the mother without first diminishing the size of the head. Failure to realize this has resulted in great and unnecessary mutilation of the mother. The sooner we realize this and increase the indications of craniotomy especially on the dead fetus, the better will be the obstetrics of the country.

The results so far as the hydrocephalic child is concerned are extremely unfavorable. My position is something like this: if the mother's life or health be not endangered, I would not in any way injure the living hydrocephalic fetus. However, the chances of doing anything for hydrocephalic children are so poor that I do not think it justifiable to add to the obstetric septic dangers of the mother in any way in order to attempt to save children where the primary and ultimate prognosis is so poor.

As regards situs inversus I have had a number of cases in laparotomies performed during the past twenty years. None of these was diagnosed prior to operation, although it is only fair to state that they occurred before the present careful physical examinations were made prior to the operations. This would lead one to suspect that the condition is far more common than is generally supposed.

Dr. Rudolph A. Bartholomew: I think this case illustrates the fact that where we have failure of labor to progress we do not have to depend absolutely upon a vaginal examination to determine the cause. In such a case we have to consider whether it is due to inefficiency of the pains or to some abnormality of the birth canal, either in the bony or soft parts or whether it is due to some abnormality of size or position of the fetus. In this case we could rule out pretty well the fact that the failure to progress was due to inefficiency of the

pains. We could also rule out the fact that the failure to progress was due to abnormality of the birth canal for the bony and soft parts apparently were normal. We had then to consider whether there was something responsible on the part of the child. A careful abdominal examination in this case or in any case is important to make out whether the child is in the proper state of flexion. In this case we determined very definitely that the cephalic prominence was on the side on which the back was and not on the opposite side as it should be. That was the first thing which indicated some abnormality.

Another point of interest is that on rectal examination the large fontanelle could be detected lying directly over the cervical opening. As soon as the head gets out of flexion to some degree the large fontanelle tends to be applied more and more over the cervical opening. The character of the fontanelle in this case was also significant, although we did not appreciate that at the time as much as we should have. The large size of it and the very great movability of the bones in a case where we could not hear the fetal heart would have suggested at once a macerated fetus. Here it was distinctly a surprise to hear good fetal heart tones with such a fontanelle.

It is also of interest to note how easy it was to perform the craniotomy without the use of any special instruments. Where the head is lying very low in the canal it can be done very easily with the scissors alone.

COLEY'S MIXED TOXINS IN THE TREATMENT OF SARCOMATA WITH A REPORT OF FOUR CASES OF OSTEOSARCOMA TREATED BY THIS METHOD.

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The purpose of this paper is to give in brief the circumstances which led to the adoption of "Coley's Serum" as one of the agents for treating sarcomata; together with a report of four cases of sarcoma of bone which have been treated by this method in the Surgical Clinic of this Hospital in the last eighteen months.

In 1884 Dr. Bull at a New York hospital operated four times on a patient for recurrent round celled sarcoma of the neck. Shortly after the last operation, erysipelas developed, the tumor disappeared, the patient left the hospital well and was in perfect health seven years later when last seen. Previous to this incident, Bush in 1866 had noted that occasionally an attack of erysipelas benefited a sarcoma. This fact had been observed in the seventeenth century but no practical application had been made of it. Later Billroth reported a case of sarcoma of the pharynx which was cured by an attack of facial erysipelas. It was then suggested that in inoperable cases of sarcoma, erysipelas might be established artificially. Soon Fehleisen began inoculating malignant tumors with the streptococcus of erysipelas. Dr. W. B. Coley, ignorant of these experiments of Fehleisen, was so impressed with Dr. Bull's case that he undertook a series of investigations. In 1891 he attempted to produce erysipelas in inoperable cases of sarcoma by inoculation. After numerous failures he did succeed in successfully inoculating seven minims of a bullion culture in the skin over a tumor in the neck. In twelve hours a typical erysipelas developed. In two weeks the patient was well and remained so for eight years.

Dr. Coley collected thirty-eight cases of malignant disease in which erysipelas had occurred. Of these, eleven became well and thirteen showed marked improvement. This information led Dr. Coley to continue his experiments. He soon determined, (1) that it was hard to produce erysipelas at will: (2) the curative properties were derived from the toxic principle of the streptococcus and hence this might be utilized without an actual attack of the disease: (3) there was real danger of death from this artificially produced erysipelas. He had two deaths that year. In his defense it might be said that he was using as subjects for his investigations only those with hopelessly inoperable sarcomata.

In 1892, Coley began experimenting with the toxins and not the living germs. He soon found that injected filtered toxins produced local and constitutional reactions identical with those of an erysipelas of mild degree. Utilizing an idea obtained from some experiments by Rogers, Coley used cultures of the Bacillus Prodigiosus to intensify the action of the streptococcus.

The fluid is prepared by making a bullion culture of the streptococcus of erysipelas, which culture is sterilized by heat. The Bacillus Prodigiosus is grown separately; it is sterilized, reduced to a dry powder and a certain amount by weight of this powder is added to each ounce of the streptococcus broth. A little glycerine and thymol are added as preservatives.

Briefly, the method of administration is as follows:

I. Begin with a hypodermatic injection of a minimum dose, usually one-fourth minim. Note this as a corollary. The more vascular the tumor the more severe the reaction. Local injection into the site of the tumor to be smaller than injection at a distance.

II. The dose is gradually increased till a chill occurs (generally one-half to two hours

PLATE I

Fig. 1. Showing condition of Tibia at time of entrance to Hospital.

Fig. 2. Showing improvement following operation.

Fig. 3. Showing Maximum Repair.

Fig. 4. Showing evidence of recurrence of the sarcoma.

CASE 1. Sarcoma of Tibia before and after use of Coley's Toxins.

after injection) followed by a temperature of 101° to 104° F.

III. If there is much depression following the reaction give the injection every other day; but if the patient can bear it, daily injections are better. The object is to get a reaction after each injection.

IV. Give tonics and keep the bowels regular.

V. If there is no improvement after four weeks, the chances are that none will occur and it may be wise to abandon the treatment.

Since 1892 Dr. Coley has treated sarcomata with these toxins alone in inoperable cases, or in connection with surgical procedures (both conservative and radical) in a very large number of cases. From time to time he has reported unreservedly the results of this treatment for malignant growths of various types. Since his investigations were reported, many other men have tried them and their experience as published agree, in the main, with those of Dr. Coley.

These results for sarcomata (to which type of neoplasm this paper is limited) may be tabulated somewhat as follows:

10 to 15 per cent. show apparently a permanent cure.

15 per cent. (circ.) show temporary local improvement.

15 per cent. (circ.) the local tumor disappears but later returns.

15 per cent. (circ.) the local tumor disappears but metastases appear.

35 to 40 per cent. show no improvement whatever.

A study of these reported results seems to justify the following conclusions:

The use of Coley's toxins does occasionally produce an alteration of the usual clinical course of sarcomata and brings about improvement and even cure.

It should be recommended in hopelessly inoperable cases. No case of sarcoma is too desperate to warrant a trial. Of such cases, 10 to 12 per cent., hopeless from any other standpoint have been successful.

In the case of sarcomata of the extremities, it should be tried for a short time (two or three weeks) before amputation. If there is prompt and marked improvement, then conservative treatment may be conducted and the limb saved. If there is no improvement, operation can be performed with even greater chances of ultimate success than if the toxins had not been first used.

The greatest value of the toxins lies in the judicious combination with conservative operative treatment. The toxins should then be administered for a considerable period of time with the hope of destroying the cells which have been left behind and so lessen the chance of local and metastatic recurrence.

Our experience in treating the four cases to be reported coincides largely with that of those who have published their results, apparent cures in seemingly hopeless cases and temporary improvement in others.

Harmer of Harvard in his report of thirty-two cases shows that five of his six cures were for sarcomata of the nose and accessory sinuses. Case four, an apparent cure, is that of an inoperable osteosarcoma of the antrum. There are practically no cases on record of sarcomata of the humerus cured by operation, even after as extreme a procedure as interscapulothoracic amputation. Yet Coley in the *Annals of Surgery* for November, 1914 reports two such cases in which curetting merely was done, the patients treated as inoperable and put on the mixed toxin treatment. One was well four years and the other fourteen years later. Our case (2) is that of sarcoma of the head of the humerus apparently cured.

The other two cases, one of sarcoma of the tibia and the other of the femur showed marked temporary improvement.

CASE REPORTS.

CASE 1. Miss T. F., a school girl, aged 17, entered the Surgical Clinic March 1, 1915, because of pain and swelling in the right knee with inability to use the limb.

Family history and past personal history are negative.

Trouble in the right knee was first noticed early in October, 1914. There is no history of trauma save for the fact that a year previously the patient had been thrown in a runaway accident and the right ankle bruised at that time. The injury healed rapidly, was never sore, and never disturbed her.

In October, 1914, the patient first noticed a pain in the right knee and tibia. This was sharp, came in paroxysms, and increased in frequency. At the time of her entrance to the Hospital the pain was practically continuous, though it was aggravated by motion. Soon after the pain started, there was noticed a swelling just below the knee on the outer side of the leg. It was tender and gradually increased in size. A radiograph was taken with the following report: "The head of the tibia is the seat of a rather absorbing process which has resulted in the loss of all details of the external

portion. The joint surface is spared. There is some swelling. No periosteal reaction, no abnormal calcification. The cortex has entirely disappeared both front and back. Evidently an infiltrative growth within the bone. Diagnosis, sarcoma." (Plate 1, Fig. 1.)

On the strength of the history, the examination and the radiograph, a diagnosis of osteosarcoma was made and an operation advised. The laboratory findings were negative. The patient was operated upon March 4, 1915. A linear incision was made over the tumor and the periosteum exposed. This was everywhere intact and the neoplasm was found to be wholly within the bone. The periosteum was incised and the tumor material removed. This was soft, vascular and cellular. The whole cortex of the bone was eroded, save for some particles still adherent to the periosteum. The cavity was packed with gauze impregnated with 1-10,000 adrenalin solution to control the hemorrhage.

The pathologic report on the specimen removed at the operation was, "Giant celled myelogenous sarcoma."

The patient reacted promptly from the operation and the next day Coley's toxins were started. The initial dose was one-fourth minim. This injection was followed in four hours by a chill and a temperature of 101.5°. The injections and the dosage were increased as rapidly as was safe according to the reaction obtained. The maximum dose of nineteen minims was given April 10, 1915, about five weeks after the operation. The patient improved rapidly, gained weight and suffered no pain.

On April 28, 1915, a second course was started. The maximum dose of twenty minims was reached in less than a month and the patient was discharged May 22, 1915. At that time the bone cavity had markedly diminished in extent and was filling in with healthy granulation tissue. There was no evidence of a recurrence and the patient was able to walk with crutches.

On June 29, 1915, the patient returned for examination. This showed the bone defect filling in nicely; there was no tenderness over the bone on pressure and no evidence of a recurrence. The X-ray showed a progressive obliteration of the bone defect with new formed osseous tissue. (Plate 1. Fig. 2.)

In August we wrote the home physician advising a third course of the Coley's toxins. This was started August 18, 1915, and was continued to a maximum dose of fifteen minims.

We saw the patient next on November 5, 1915. The general health of the girl was excellent. The wound was practically healed, and

PLATE II

Figure 1. January 22, 1915. Before operation. Showing condition of head of humerus at time of entrance into Hospital.

Fig. 2. Oct. 4, 1915. After operation. Showing surgical defect and complete absence of the tumor.

CASE 2. Sarcoma of the Head of the Humerus before and after treatment with Coley's Toxins.

Fig. 1. August 31, 1915.. Before operation. Showing condition of Femur at time of entrance to Hospital.

Fig. 2. January 10, 1916. Showing recurrence of the tumor at site of operation.

CASE 3. Sarcoma of the Femur before and after the use of Coley's Toxins.

the function of the limb was perfect. An X-ray picture at that time showed considerable improvement. (Plate 1, Fig. 3.)

Early in February, 1916, the patient returned for further advice. As before, an X-ray picture was taken which showed about the same condition as previously, but examination locally showed a small soft area on the anterior surface of the tibia near the level of the center of the former incision. Another course of the toxins was advised and was carried out by the home physician.

March, 1916, the patient showed much improvement. Wound practically healed and it was almost impossible to find the spot which had come under suspicion at the last examination.

I had hoped, then, that I could place this case among those which were cured by the toxin treatment, and had I given this report earlier, I might have placed it there. But a month has made a difference. April 26, 1916, Miss F. again presented herself at our request. Examination showed the wound entirely healed but examination of the suspected area showed that it had increased somewhat in extent. There was some swelling, redness of the skin and pulsation. A radiographic picture was taken and confirmed our fears. The thick sclerosing margin of the surgical defect has almost entirely disappeared; the cortex on the internal surface is much reduced in thickness. Diagnosis, "recurrent sarcoma of the head of the tibia." (Plate 1. Fig. 4.)

The patient was advised to return home for two weeks and continue the course of toxin treatment which she had interrupted to come to the Hospital. If there be no improvement at the end of this period, we will undoubtedly advise another local removal of the tumor with intensive toxin treatment here at the Hospital.

CASE 2. A. W., schoolboy, age 15, entered the University Hospital January 22, 1915, because of a swelling in the right shoulder and an inability to raise the right arm.

Family history and past personal history are wholly negative.

Present Trouble.—In April, 1914, the patient began to have pain in the right shoulder. There was no history of injury that could be recalled by either the patient or by anyone in his family. The affection was diagnosed as rheumatism and so treated. Gradually the pain became more severe and an increasing disability finally brought the patient to the Hospital.

On entrance there was noted a swelling involving the region of the head of the humerus anteriorly; there was some atrophy of the muscles of the right hand and the grasp of that hand was weaker than that of the left. A radiograph was taken and the picture was interpreted by our roentgenologist as follows: "On the external anterior surface of the head of the humerus involving both the epiphysis and the diaphysis, there is an irregular area of absorption with localized areas of calcification on both

in the center and the periphery extending well out toward the integument. The head of the bone is considerably enlarged with practically no wasting of the shaft of the humerus distal to the pathology. Diagnosis: Sarcoma of the head of the humerus." (Plate II. Fig. 1.)

Blood examination showed Hgb. 90. Reds, 4,900,000. Whites, 7,500. Urine negative. A probable diagnosis was made of sarcoma of the head of the humerus and operation advised.

The patient was operated upon January 29, 1915. An incision was made over the deltoid muscle down to the bone and a large cavity covered by a mere shell of bone was discovered. This was opened and a soft medullary, vascular tumor mass was removed. The wound was packed with gauze.

This specimen was examined by the pathologist and the following report returned: "Myelogenous sarcoma. Great numbers of enormous giant cells in a matrix of large round epithelioid cells, probably of endothelioid origin. Prognosis not very good. Should be searched carefully for metastases."

On the third day following this operation Coley's toxin treatment was started. The initial dose was one-fourth minim. Four hours after the injection the temperature rose to 103.6°, pulse 120, respirations 22. The temperature reached normal the next day. The same dose was repeated three times with the same result. A fourth and fifth time the same dose was given with but slight reaction. Then it was deemed safe to increase the dosage. On the fourteenth day after the operation the dose of one minim was reached. Following this the serum was increased one minim at a time and was given every day, or every other day according to the reaction to a maximum dose of nineteen minims.

The wound was dressed daily and improved rapidly. The bone cavity narrowed more and more with seemingly healthy granulations. The patient was discharged March 17, 1915, to be treated by the home physician who co-operated finely. The wound was dressed as we directed and a second course of the serum was given.

June 15, 1915, the doctor wrote as follows: "The wound has healed nicely and the patient is in good health and is getting the use of the arm. There is no pain and the arm is nearly as large as the other."

In September, 1915, we wrote for further information to the physician who sent the patient to us for our examination on October 4, 1915. Examination on that date showed a perfectly healed scar on the right shoulder. "Motion of the shoulder is only slightly limited. There is no pain. The patient has full functional use of the arm. Has gained weight and is doing regular farm work."

A radiograph taken at that time showed excessive calcification in the head of the bone, and the defect obliterated. (Plate II, Fig. 2.) The patient was referred to the Medical Clinic for examination with reference to metastases and the report was returned that no evidence of metastases could be found. Though the condition seemed wholly cured the physician was advised to give another course of the toxins.

On March 20, 1916, fourteen months after the operation, the physician sent this note. "The boy is doing fine. The shoulder is about like the other one. He is working in the mill every day. No pain, and he can use it almost as well as ever."

Case 3. Miss M. G., age 18, came to the Hospital August 31, 1915, because of pain and swelling in the left knee.

Family history and personal history are negative.

In February, 1915, the patient slipped on some ice and turned her left ankle thereby wrenching the knee. This did not trouble her till three weeks later when she began to have sharp pains darting up and down the leg, and had to walk with a limp. The pain became more severe and in May the knee began to swell. She continued in school but when the semester ended she kept quiet and the knee became less painful and the swelling decreased. July first she started work in the dining room of a summer hotel. This work brought on the old trouble. On August first she again turned her left ankle and twisted the knee. This made the pain much more severe and she could not walk on the limb. For four weeks prior to entrance the patient had been using crutches.

Examination at the time of entrance to the Hospital showed a swelling just above and external to the knee joint, rather firm, smooth and tender. The blood count was about normal and urine was negative. The X-ray report was as follows: "There is an almost exactly spherical shadow about the size of an orange on the lateral aspect of the knee, central just over the external condyle. It has produced decalcification and absorption of the shaft for about one-half its diameter. The external condyle is almost completely decalcified. There is almost no tissue reaction, a mere suggestion of calcification along one edge. Diagnosis: Evidently some neoplasm, presumably sarcoma." (Plate III. Fig. 1.)

The patient was operated in the Surgical Clinic, September 4, 1915, under ether. A longitudinal incision was made over the tumor and the mass exposed. The periosteum was incised and the tumor removed. The material was very soft and friable and its removal was accompanied by profuse hemorrhage. The cavity was found to extend nearly through the bone. It was swabbed with a half per cent. formalin solution and packed with gauze. The pathologic report on the specimen removed was, "Giant cell, spindle cell, myelogenous sarcoma. Much necrosis."

The patient rallied promptly from the operation except that she ran a rapid pulse for several days for which condition tincture of digitalis was administered. Coley's toxins were started on the second day after the operation with the usual initial dose of one-fourth minim. The maximum dose of twenty minums was reached on the fortieth day after the operation, the average interval of doses thus being one every other day.

A second radiograph, taken November 9, 1915, showed very little change, and little evidence of a reparative process. Clinically the skin incision healed well but the bone cavity did not granulate in as was hoped.

On November 10, 1915, a month after the completion of the first course, a new course of toxin treatment was begun with an initial dose of one minim. The patient seemed to react more severely to this second course and it could not be given so rapidly as before. The most marked reaction was obtained at the ten minim dose when the temperature reached 105.1°. The temperature promptly fell and reached normal the next day. The last dose was given January 15, 1916.

In the meantime, during the second week in January a change was noted. At the lower angle of the wound there began to protrude what at first seemed like granulation tissue. But it grew rapidly, and on palpation it was soft and pulsating. We became suspicious of it and a small portion was removed on January 11 for pathologic diagnosis. The report came back, "Giant celled sarcoma with pyogenic infection. One part of the sarcoma seems to be rapidly proliferating." A third radiograph on January 10, 1916, showed considerable progress in the erosion with no evidence of a reconstructive process. (Plate III. Fig. 2). Examination a few days later showed a marked increase in the size of the tumor. From this weight of evidence it was decided to perform a radical operation, and a hip joint amputation was done on January 17, 1916.

Macroscopic examination of the limb after operation showed that the tumor had extended to the surface of the cartilage covering the external condyle of the femur. It had infiltrated the soft parts along the external ligament to the head of the fibula. Of the lower end of the femur internal to the tumor there was left but a thin shell of bone which was easily crushed. The tumor extended posteriorly into the soft parts to within one-quarter inch of the popliteal vessels.

The patient's convalescence was uneventful and she was discharged March 13, 1916, with the stump entirely healed, general health excellent and with no sign of recurrence.

Case 4. Mrs. C. S., age 58. Transferred from the Otolaryngologic Clinic, July 24, 1914. The patient came because of swelling of the left side of the face. The family and past personal history are wholly negative.

In March, 1914, after a long drive in the cold, the patient noticed a pain in the left side of the upper lip. This grew worse and became neuralgic in character. A month later a swelling began to appear beneath the left eye. This was poulticed without effect. A doctor was consulted early in May and he gave her two X-ray treatments. The tumor grew larger and the patient was referred to a specialist who curetted the antrum of Highmore and sent a specimen of the curettings to Ann Arbor where a diagnosis of "Osteosarcoma" was made. During July, strong X-ray treatments were given with no improvement.

Examination on her entrance to this Hospital revealed the following condition: "The left cheek is occupied by a firm, dense smooth tumor apparently appearing through the anterior wall of the antrum and infiltrating the cheek tissues to the angle of the jaw. There is some exophthalmos. The skin of the cheek is raised by the tumor to the level of the nose, is edematous, red and congested. The tumor is hard and immovable. The lateral wall of the nose is pushed forward so as to come in contact with the septum." A diagnosis of inoperable osteosarcoma was made and the Coley toxins advised.

The initial dose of one-fourth minim was given July 27, 1914. It was then decided to ligate the carotid artery on that side to lessen the blood supply to the tumor and on July 30, the left common carotid artery was ligated. Two days later the "Serum" treatment was recommenced. The patient showed no particular reaction till a dose of eight minims was

reached. The most marked effect was obtained at the last dose of fifteen minims when the temperature reached 104.6°. The patient was discharged September 13, 1914. The tumor was somewhat lessened in size, the left eye was normal and the patient had gained in weight and strength.

The toxin treatment was continued at home by the patient's physician. The following is his report of the treatment:

"September 24, 1914, the initial dose of one minim was given. Daily injections for two weeks, then every other day or so till November 24. Then courses of a few days' treatments followed by a few days' rest. From September, 1914 to March, 1915 fifty-six injections were given. Then at longer intervals to August, 1915."

A letter from the doctor dated November 9, 1914, says, "Mrs. S. is still progressing finely. Her face is normal except for some redness and hardness due to chronic inflammation."

A communication from this same physician October 8, 1915, almost a year later, states that there is no sign of a recurrence. The doctor further says that the patient has asked him to produce some fresh serum and use it. It is rather unusual, we find, for a patient once all signs of disease are gone to be willing or eager to continue treatment over such an extended period of time.

CONCLUSIONS.

Our experience, as indicated by these four cases, seems to justify us in using Coley's mixed toxins as recommended by the man who has given his name to the fluid.

One patient with sarcoma of the antrum, patently inoperable, who had been given a course of X-ray treatments without improvement by a man who is acknowledged to be an expert in his line, is now well for over twenty months.

Another patient with sarcoma of the head of the humerus, also clinically inoperable, is well a year later, apparently cured and still possessed of his arm.

In the third case, the growth of the tumor was delayed, the health of the patient was greatly improved and the subsequent operation was unusually well borne.

In the fourth case the patient is in good health more than a year later with no evidence of metastases. Unfortunately there is now distinct evidence of a local recurrence. But the general health of the patient is much improved, and if a second operation or if amputation even is indicated later, the chances for a much more favorable and permanent result have been increased.

DISCUSSION.

Dr. Walter A. Hoyt: We have tried to be fair in our estimate of the value of these toxins and not to be overenthusiastic. From our experience we think we are justified in continuing their use especially in the inoperable cases or in operable cases where it seems possible to carry out the toxin treatment.

Another very striking point in these cases, is the variability of the results. I was very much interested when the Detroit Surgical Society met in Ann Arbor to hear the different viewpoints. Some men had had several cases of permanent cures, others had never had a case cured. Probably this is due to the use of the toxins, in different varieties of cases. We never consider its use in periosteal sarcoma. This variety, we feel, is purely surgical and an amputation where possible should be carried out immediately. In operable sarcoma of a soft part we have used it in several cases but it has been after operative treatment. Dr. Darling has a case in his private practice of lymphosarcoma. This patient has now been under treatment for two years and a half, has had three different operations, one in which glands were removed from the inguinal region, followed by Coley's toxins. About a year ago this patient came back with a similar mass in the axilla. This was removed with no evidence of metastasis. The patient is well at the present time.

It is important to note that a few years ago it was thought to be criminal to temporize with a sarcoma of this nature. It is interesting to see in the reported cases that metastases from this type of tumor are not very common. There has been considerable argument of late as to the malignancy of giant cell sarcoma and a good many men now claim that giant cell sarcoma is not malignant as compared to the other forms. We have tried other cases besides these four reported, but unfortunately haven't good records. I believe the reason that there are not better results is because they are not followed up by prolonged treatment.

Why Coley's toxins do good is still a mooted question. It is possible that other vaccines would do just as well as Coley's toxins. There has been quite a little work with typhoid where results have been as good after the use of other than the typhoid serum. We had a case of actinomycosis of the abdomen and we gave the man some Coley's toxins intravenously. He had previously been running a temperature of 101 to 102°. The smallest dose of Coley's toxins gave us a typical Coley's toxin reaction. His temperature which was previously high has dropped down and he now has a normal temperature. This is simply working in the dark, but it is interesting. We believe it should be used in all cases of sarcoma, either with or without operation.

Dr. William Lyon: I want to mention a single case of sarcoma treated by Coley's toxins which I had in my practice ten years ago. It was an

interesting case in that it was extremely severe, being a sarcoma apparently involving the ileum and the head of the femur. The patient was in an exceedingly bad condition when I first saw her. She was a woman of forty and had been suffering from so-called rheumatism of the hip for some months. She was quite emaciated and had a marked anemia. Two surgeons decided that it was wholly inoperable and advised Coley's toxins. This patient could not tolerate at any time more than four minims. The first dose of one-quarter minim gave a marked reaction. By the thirtieth dose we had arrived at two minims, still getting reactions so severe that the patient seemed about to die several times. At this time there was a rather rapid enlargement of the mass, the skin over it became reddened and an abscess developed from which we evacuated about thirty ounces of pus. This left a very ragged nasty cavity which was filled with bismuth paste and finally healed. After about five or six weeks of treatment the patient in turning over in bed produced a fracture of the femur. Now after ten years the woman is in perfect health, weight one hundred sixty pounds with decided shortening of the femur but with no sign of a recurrence.

EIGHT YEARS IN THE DEPARTMENT OF INTERNAL MEDICINE.

ALBION WALTER HEWLETT, M.D.
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On assuming duties at a new university the professor is often expected to review the general problems of his subject and to outline his plans for the future of his new department. His views are of necessity based largely upon his past experiences. While the latter are usually of personal interest only, it has seemed to me that certain developments during the past eight years in the Department of Internal Medicine might also be of general interest. These years have witnessed an extraordinary growth in our University Hospital, a growth which has established the proposition that in this country, as in Germany, a large university hospital can be developed in a small city. The past eight years have also been noteworthy by reason of the wide discussions as to the social aspects of medicine and the duties and obligations of those who teach its clinical branches, particularly with respect to research on the one hand and to private practice on the other. Any actual attempts to solve these problems are worthy of record.

It is not my purpose to discuss the earlier history of the University Hospital. The clinical facilities of the earlier days appear meager enough to one at the present time and the tenacious adherence to these facilities despite the temptation to remove the clinical work to Detroit seems justified now, not alone by the anticipated growth of the Hospital, but also by the fact that in those early days medical education in the country at large was carried on mainly by didactic lectures rather than by personal instruction at the bed side. At the present time the university which contemplates the establishment of clinical work in a small university city may well pause before the early history of Michigan's University Hospital. At the same time, however, it may receive encouragement from the fact that in the western states, at least, the public has been educated to the view that a medical center, whether public or private, can be successfully operated in a small city and that patients are willing to travel considerable distances in order to receive expert medical attention.

In 1908 the University Hospital had already reached dimensions which justified the hopes of those who had looked forward to a clinical center in Ann Arbor. Its growth since that time has shown beyond all doubt that so far as size is concerned the future of the Hospital is secure.

It is apparent from these figures that the growth of the combined departments of internal medicine, pediatrics and infectious diseases has kept pace with that of the Hospital in general and that approximately one-fourth of all patients coming to the Hospital are seen at some time by the staff of these departments.

In 1908 the services in pediatrics and in contagious diseases were numerically deficient when compared with other services in the Hospital. Thanks, however, to the direction of Dr. Cowie, to the enactment of state laws making it possible to send more children to the Hospital at the expense of the county or state, and to the generosity of the city of Ann Arbor in providing a contagious ward for the Hospital, the numerical deficiency in these classes of patients is being remedied and one may safely predict that in the future our students will have little cause to complain of lack of material in either pediatrics or the contagious diseases.

From the social standpoint the chief function of the University Hospital is to provide expert and specialized medical services for those persons who cannot well afford the cost of similar service elsewhere. The legislature of Michigan has enacted laws whereby indigent patients, capable of being helped by expert service, can be sent to the University Hospital for treatment, the cost being charged back to the county or to the state. It is not the indigent alone, however, who stand in need of expert medical

attention. The remark has often been made that the very rich and the very poor receive the best medical attention; the former because they can well afford to employ the most expert specialists, the latter because the modern charitable hospital is usually one where expert service is rendered. The person of moderate means, however, only too frequently gets along without highly specialized services. On the one hand he is too proud to be an object of charity while on the other he is unable or unwilling to pay the fees necessary for specialized service. And yet it is evident from the standpoint of the community that this class of patients should be given the best possible medical service, for under conditions of health they are self supporting and valuable workers, whereas if broken in health their small capital soon makes them a burden either to the family or to the community at large. The clientele of the University Hospital is derived very largely from just this social class; persons who are trying to husband a slender capital in the face of serious or chronic illness. In caring for these patients, it seems to me, the University Hospital has become an important factor in the broad social problems of the state and in the future it will doubtlessly play an even more important role than in the past.

From the standpoint of internal medicine the service which must be rendered is, first of all, based in large part upon the special examinations which are now possible in any good medical center but which can be obtained elsewhere only with considerable difficulty and often at considerable expense. These examinations include microscopic and chemical examinations of the blood, the stomach contents and the excreta, cardiographic records, bacteriologic and serologic examinations, and study by means of the X-ray. With these aids it is frequently possible to arrive at conclusions which would otherwise be impossible. Having made a diagnosis, the question remains whether a patient can be benefited by treatment at the Hospital. If not, he is usually returned to the care of his home physician to whom a letter is written in which the results of the examination are indicated and further treatment suggested.

During the earlier years of my connection with the Hospital the medical wards were rarely crowded and patients presenting special diagnostic difficulties were advised to enter the Hospital for a careful examination. The routine hospital records and the examination by a group of student and graduate assistants furnished data upon which a diagnosis could be based. During the past year, however, the medical wards have frequently been very crowded, partly because larger numbers are coming to the Hospital and partly because the number of seriously ill patients who must be kept in the wards for longer periods of time has also increased. For this reason the plan of admitting patients for diagnostic purposes is gradually becoming more difficult. This fact is evident in the above chart of admissions where it will be noted that while the total numbers coming to the department have steadily increased the number of in-patients has remained practically constant for the past four years. In order to render an efficient diagnostic service in the future it will be necessary either to increase the number of beds at the disposal of the department or to reorganize

GROWTH OF THE UNIVERSITY HOSPITAL AND OF THE DEPARTMENT OF INTERNAL MEDICINE DURING EIGHT YEARS.

Year	Total Patients coming to the Hospital	In-patients Internal Medicine Proper	All patients Internal Medicine Proper‡	All Patients Pediatrics and Infectious Diseases	Sum Total in Department
1907-08	3,727		740	101	841
1908-09	4,259	384	877	123	1000
1909-10	4,856	477	1122	205	1327
1910-11	5,362	531	1249	102	1351
1911-12	5,285	624	1341	218	1559
1912-13	6,803	750	1574	229	1803
1913-14	8,027	847	1653	359	2012
1914-15	9,050	792	1792	545	2337
1915-16†	11,100	740	2000	645	2645

†Figures for June 1916 are estimated.
‡Includes inpatients, outpatients and referred patients.

the out-patient service in such a manner that out-patients can be submitted to a fuller routine examination by a group of assistants.

According to modern standards, the university clinic should devote itself not only to teaching and to the care of patients, but it should also be a center for testing new methods of diagnosis and treatment and for the scientific study of disease. The clinic which is not adding to the sum total of medical knowledge is already falling in the rear. In order to perform this important function two requisites are necessary. In the first place members of the clinical staff must devote a portion of their time to research; in the second place facilities for such research must be furnished by the Hospital or by the University. It is becoming evident that if the members of the clinical staff are to do research in addition to their hospital and teaching duties, there will be relatively little time left for private practice. During the past eight years the members of the staff of internal medicine proper have been restricted in private practice to the extent that no private offices have been opened in the business district of the city. The plan has proved effective in centering the major interest of the staff upon hospital and university duties. Two disadvantages of the plan have become apparent. In the first place it has not been possible to pay the assistants sufficiently large salaries to retain them for an indefinite period with the University. After a few years they must look for some more remunerative positions elsewhere. In the second place, owing to the absence of private wards in the Hospital, the assistants are to a great extent deprived of the experience that comes from contact with private patients. Attention to the relief of minor and seemingly unimportant complaints, personal interest in the patient as an individual and adjustment of ones self to the views of the patient or of his family are too often neglected, even when the staff member is one possessing high ideals and great consideration for others. These objections to the plan followed do not, to my mind, outweigh the advantage of having the staff devote its main energies to university duties. It may be pointed out, however, that where a private ward is attached to the hospital the older assistants are able to increase their incomes and to gain experience in handling private patients without at the same time sacrificing an unnecessary amount of time. This plan has been tried at the Barnes Hospital in St. Louis and at the Peter Bent Brigham Hospital in Boston.

From the standpoint of the students also there is a disadvantage in bringing them in contact solely with men who devote themselves to the scientific side of medicine. Fortunately this difficulty can easily be overcome by having on the staff certain men who are engaged in private practice. Associated with my department for example is an instructor in therapeutics who is thus engaged.

It seems evident that men who are willing to devote their best years to the university side of medicine should be provided with adequate facilities for study and research. The problems confronting internal medicine at the present day involve not alone the usual clinical observation of patients but the study of these patients by the various methods that have been developed in biochemistry, physiology, bacteriology and immunology. These methods are often costly both in time and money and they require laboratory space, special apparatus and the services of technical assistants. Without these facilities such work can be carried on only under considerable difficulties.

Herein it seems to me has been the most serious defect in my department. Our facilities for the study of cardiovascular disease have been excellent but only beginnings have been made along other lines. The growth of the Hospital has been so rapid and the demands for more beds and for a larger staff of physicians and nurses so insistent that requests for larger and more efficient laboratories must often have seemed trivial. But we should remember that size is only one factor in the constitution of a great clinic. In the leading clinics new ideas are being originated or having originated elsewhere are being tested; and at the present day, so far as internal medicine is concerned, this means work in a clinical laboratory equipped for chemical, bacteriologic and physiologic work. The University Hospital has reached a size that is adequate or nearly adequate for its university purposes, and it seems to me that the time is at hand when more effort should be made toward its development as a center of clinical research. In the appointment of my successor a step in this direction has been made. Dr. Foster has made important contributions in applying the methods and data of biochemistry to the solution of clinical problems and he is to have a chemical laboratory connected with his service. It seems to me that further encouragement to this and to similar lines of development must be given, if Michigan is to keep pace with the leaders in clinical medicine.

I cannot close without expressing my appre-

ciation of the work and devotion of those who have been associated with me in the department for the past eight years. One feels a special responsibility for men who spend a number of years in the department and one follows their future careers with peculiar interest. Of those who have been instructors in the department during the past eight years, Dr. Van Zwaluwenburg has become professor of roentgenology at this University, Dr. Warren has become professor of medicine at the Long Island Medical School, Dr. Agnew is professor of Medicine at Alabama, Dr. Schmidt is to enter practice in Detroit, while Dr. Wilson and Dr. Gilbert are to remain under my successor. To develop leaders is surely one function of the University and any reputation which may come to Michigan from such development lies in the hands of these and of similar men in other departments, who have spent a number of years at the Hospital.

DEMONSTRATION OF A CASE OF LUPUS VULGARIS.

UDO J. WILE, M.D.

(From the Clinic of Dermatology and Syphilology, University Hospital, Ann Arbor, Michigan).

The case which I wish to demonstrate is one of rather more than usual interest in view of the fact that the condition it illustrates is rather rare in this country, although common enough in certain parts of Europe. It is a case of extensive lupus vulgaris with extreme destruction of the nose and neighboring parts of the cheek.

Lupus vulgaris was introduced into this country probably from Southern Europe. The cases are sufficiently rare here to excite more than usual interest. Abroad they hardly are worth presenting at a society. The St. Louis Hospital in Paris which has 1200 beds for the treatment of cutaneous diseases and syphilis, almost every nurse and attendant is an old case of lupus, some of them never leaving the grounds.

There is probably no other granulomatous or malignant disease in which greater destruction is commensurate with general good health. There are cases in which the orbits are invaded, nose entirely eroded, mouth replaced by a small opening surrounded by a very dense scar tissue, the ears gone, yet the general health is conserved.

Association of visceral tuberculosis with lupus is relatively uncommon and one can say conversely that in the various sanatoria for pulmonary tuberculosis, lupus vulgaris is exceedingly rare as a complication or concomitant finding. At the Adirondack Cottage Sanatorium and at Saranec Lake Village where there are some 15,000 people all of whom are tubercular, there was not during the year 1908 a single case of lupus vulgaris. Association with bone tuberculosis occasionally occurs and if one were to examine these patients very carefully it is not unlikely that tuberculosis might be found clinically without subjective findings.

The question arises whether lupus is exogenous or whether it comes from the blood stream. The peculiar predilection of lupus for the face, also for the nose, sides of the cheeks and localization and isolation at that particular place make it seem unlikely that there is a hematogenous source of infection. On the other hand, we not infrequently see lupus vulgaris in places where the process is found invading the entire body. In such cases we must assume a hematogenous infection. Both methods probably occur. Exogenous origin is considered the most common source today for cases of lupus with isolated lesions.

This girl visited this clinic three years ago with an active lupus vulgaris on both sides of the face which had eroded most of the nose. She is Finnish which is a point of interest because lupus vulgaris is found commonly in Finland. The case, of course, could not have been operated upon. The destruction had already occurred, the disease was far advanced and was spreading. We placed the patient on appropriate hygienic measures. She improved rapidly, was given increased doses of tuberculin and the lesion was curetted and cauterized. After four to six months residence in the Hospital the patient was returned with a false nose to her county in a very good condition and with an excellent cosmetic result. She returns now with the disease in exactly the same location and growing more rapidly and more extensive.

The disease is very successfully combatted so far as checking it is concerned in countries where the condition is more commonly seen, by phototherapy, that is, by the Finsen light, the common carbon light cooled by having a constant flow of water passing between the source of the light and a lens which is closely applied to the affected parts. The ideal cosmetic results are obtained with this light. They, however, require a daily exposure to a small area the size of half a dollar for one hour. This requires a special apparatus and a special nurse to give the treatment. In clinics where the condition is common, long tables are arranged with the

lights overhead and a nurse has charge of one of these tables and takes care of the pressure and change of position of the light as the patients lie for treatment.

In examining the profile of this patient one

Fig. 1. A Case of Lupus Vulgaris.

sees that the cartilaginous portion of the nose has been eroded. That is characteristic of lupus and not so characteristic of lues. A lues of this extent would most surely have eroded a good deal of bone and sequestrated a large part of the bony septum. Then one can also see the progress of the disease from without inward whereas in lues in such cases it is from within outward. The differential diagnosis is very difficult in those cases in which the disease occurs in hereditary specific individuals, a combination of syphilis and tuberculosis occurring together.

This is not the ulcerative type of lupus but is a dry form. The process is very slow in its progress. The malformation and facies are absolutely typical.

DISCUSSION.

Dr. Reuben Peterson: What will be the outcome?

Dr. Wile: Very slow progression with mucous membranes involvement. The prognosis for life is excellent. Gradually the process will involve the orbit and the ear. When it reaches the ear it spreads very rapidly and invades the middle ear.

RESOLUTIONS ON THE RESIGNATION OF ALBION WALTER HEWLETT, PROFESSOR OF MEDICINE, UNIVERSITY OF MICHIGAN.

This year has seen the last association of this Society with Dr. A. W. Hewlett as an active member. During his eight years of service Dr. Hewlett has built up a splendid clinic in the University Hospital, and by his efforts and the participation of his assistants has contributed to the brilliant success of the Department of Internal Medicine.

Be it resolved, therefore, that the Society express to Dr. Hewlett its great regret at his leaving and at the same time extend to him its best wishes for his continued success at his new post.

Moved and carried that this resolution be preserved on the records of the Society, printed in the *Journal of the Michigan State Medical Society* and a copy hereof sent to Dr. Hewlett.

TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, July 12, 1916

The President, UDO J. WILE, M.D., in the Chair
Reported by REUBEN PETERSON, M.D., Secretary

SUPPURATION OF A LARGE DERMOID CYST REACHING TO THE UMBILICUS. EVACUATION AND REMOVAL OF THE CYST PER VAGINAM. RECOVERY.

REPORT OF CASES ILLUSTRATING THE SUBSTITUTION OF THE RECTAL FOR THE VESICAL SPHINCTER.

REUBEN PETERSON, M.D.
(From the Obstetric and Gynecologic Clinic, University Hospital, Ann Arbor, Michigan).

CASE 1. This specimen has just been removed from a patient whose history is rather interesting. She is twenty-five years old, married, with one child three years old. She was well up to the birth of this child but has never been well since. About a year ago she noticed her abdomen was enlarging. Three weeks before her entrance to the Hospital she had a sudden pain in the lower abdomen, followed by high fever. She had been very ill ever since. confined to the bed with fever, loss of weight and strength with every indication of septic absorption.

Examination at entrance showed a cystic tumor extending from the pubes to the umbilicus. The abdominal muscles were rigid and the entire abdomen tender. Very little could be made out by vaginal examination on account of the tenderness, except a mass filling the posterior culdesac, continuous with the mass above. The temperature was 103°, the pulse rapid and the appearance of the patient markedly septic.

The diagnosis lay between a twisted pedicled ovarian cyst with or without infection of its contents and an enormous pus tube. Inasmuch as the mass was very limited and the other pelvic tissues not involved except by adhesions, pus tube was ruled out, leaving the diagnosis in all probability an infected ovarian cyst.

At the operation it was decided to use every endeavor to reach the suppurative mass by way of the vagina in order to avoid contamination of the parietal peritoneum, almost inevitable if treatment through the abdominal route were attempted. The uterus lay to the left and downward. The cervix was drawn sharply upward by a tenaculum on the posterior lip, the posterior vaginal mucosa incised, and the mass finally reached and opened by the sharp pointed scissors. About two quarts of pus were evacuated followed by a complete subsidence of the abdominal and pelvic mass. In wiping out the cyst cavity with a sponge on a long pair of forceps, a mass of hair and fat half the size of the hand was withdrawn, thus establishing the diagnosis of suppurating dermoid cyst of the ovary. The operation was completed by inserting a rubber tube within the cyst and holding it in place by a suture through the incised vaginal mucosa.

The patient's general condition improved after the operation but great quantities of foul smelling pus continued to be discharged through the tube and the vaginal incision. After removal of the drainage tube, the vaginal incision closed rather quickly and the opening had to be enlarged a number of times to provide for drainage. While the temperature was lower and at times reached normal, the patient still continued to be septic from absorption of the pus poured out by the secreting surface of the cyst.

Further treatment of the case presented some interesting problems. Removal of the secreting cyst wall could easily have been accomplished through an abdominal incision, but the dangers of peritonitis even with the greatest care

in protecting the uncontaminated peritoneum made me hesitate to adopt this procedure. Fortunately, the patient's vagina was quite voluminous giving hope that a removal of the completely adherent cyst wall could be accomplished from below. Under ether the colpotomy incision was enlarged and the dependent portion of the thick wall of the cyst somewhat freed by the finger from the surrounding pelvic adhesions. The loose edge of the sac was then seized by a pair of strong jawed forceps and pulled down while the finger continued to loosen the adhesions of the upper portion of the sac. During this procedure the body of the uterus was doubled backward and the fundus drawn through the colpotomy incision, thus exposing the pedicle of the cyst and permitting of its transfixion and the final removal of the entire sac. The operation was completed by drainage of the septic pelvic cavity by a rubber tube held in place by a suture through the vaginal mucosa. The patient has made a good recovery, the temperature now being normal and her general condition much improved.

It may be here remarked that surgery has greatly changed in the last twenty-five years as regards the method of approaching pus in the pelvis. Formerly, it was the custom to remove pus tubes through an abdominal incision, the operations being successful in the majority of cases because the pus was sterile. However, in quite a proportion of cases, possibly 10 per cent., the patients died of general peritonitis due to the fact that a mixed infection was present. The chances of the pus being virulent and not sterile are increased when the abscess is outside of the tube and not caused by a Neisser infection. Suppurating dermoids of the ovary are not infrequently the seat of virulent germs and attempts to remove such masses by the abdominal route are apt to result in fatal general peritonitis. Hence, since there is no certain method of determining the exact bacterial nature of the cyst contents, whether it be within or without the tube, it is safer to open and drain such collections through a colpotomy incision. Very seldom is there an operative death when pus in the pelvis is attacked in this manner, and then only when the condition of the patient is very low from long continued suppuration. Later on the pus tube uncured by vaginal drainage can be removed by abdominal incision with safety. However, the difficulty in the above case was that the secreting surfaces of a pus tube and a suppurating ovarian cyst are entirely different. The latter must be removed within a comparatively short time after being opened through the vagina, else the intense purulent discharge which does not lessen owing to the nature of the secreting cyst membrane will lead to the death of the patient through exhaustion.

CASES ILLUSTRATING THE SUBSTITUTION OF THE RECTAL FOR THE VESICAL SPHINCTER.

In my experience vesicovaginal fistulae are not as common as they were twenty-five years ago. This fact I ascribe to improved obstetrics. Most vesicovaginal fistulae, not all, result from gross neglect of the obstetric patient, failure to deliver when the presenting part is low enough to press upon the vesicovaginal septum, the long continued pressure resulting in necrosis of the septum and incontinence of urine. Even if the physician does not feel competent to remove the child, he realizes the danger of delay and sends for a more skilled colleague. Unfortunately, however, there are cases where the bladder has been extensively injured, where almost the entire vesicovaginal septum has sloughed away, at times injuring the ureters, at other times leaving the wall of the vesical opening so near the ureteral orifices as to make closure of the fistula exceedingly difficult. By various methods even large defects can be closed after one or more operations. Once in awhile, however, as will be illustrated by the cases to be reported, for one reason or another, it is impossible to close the fistula with the result that the woman is doomed to a miserable existence from the constant dribbling of urine from the vulva or else some method must be devised for the utilization of the rectal sphincter, the only sphincter in the neighborhood at all comparable with the vesical sphincter. To utilize this sphincter the ureters must be implanted in the rectum or the vaginal orifice may be closed after making an opening in the rectovaginal septum. The first method is not without danger and is usually only employed in cases of exstrophy of the bladder where the ureteral openings in the trigonum are in plain view. The other procedure is without danger to life and is the operation of choice in terrible bladder injuries which cannot be repaired by plastic surgery.

With this brief introduction I would like to report a number of cases from my public and private clinics illustrating the possibilities of the procedure.

CASE 1. The first case is that of a woman of thirty who was dreadfully lacerated by instruments after having been in labor for days. She has had complete urinary incontinence

since the middle of last March. As you will see by this picture I pass around, (Fig. 1) there is a mass protruding from the vulva looking not unlike a cystocele or rectocele. In reality it is neither but the fundus of the bladder which has prolapsed through an opening in the vesicovaginal septum almost an inch and a half in diameter. The vaginal floor was a mass of scar tissue in which were completely buried the cervix and the external os.

In spite of the dense scar tissue within the vagina it might have been possible to close the vesical opening if it had not been for another factor in the case. The same trauma which had given rise to the vesicovaginal fistula had entirely destroyed the distal portion of the urethra and that portion of the bladder into

Fig. 1. Prolapse of the posterior bladder wall through large vesicovaginal fistula. Bladder wall at the vulva at first glance looks like a cystocele or rectocele.

which the urethra entered. In other words, the vesical sphincter was completely destroyed.

Under such conditions a repair of the bladder defects whereby the woman would have control over her urine was impossible and I proposed the operation I had found eminently successful in two previous cases. Up to now she has declined, possibly thinking that some other surgeon will be able to do more for her than can I. The real reason, however, I am convinced, is that her husband will not consent to the closure of the vagina. His proposal is that we sew into the bladder a rubber tube, making a tight joint. The rubber tube is to be fitted with a cork so that when the woman feels a desire to empty her bladder all that would be necessary would be to remove the cork. Possibly if his own person were continually bathed in urine he would not be so complacent and would be willing to make any sacrifice to insure his comfort.

Case 2. The operation under consideration which is illustrated by the diagrams (Figs. 2, 3, and 4) I performed upon a patient in 1904. This was a patient upon whom I had operated for malignant disease of the urethra. So much of the urethra was involved that the vesical sphincter was impaired after the complete removal of the growth. She had incontinence of

Fig. 2. Diagram of a vesicovaginal fistula.

urine and prolapse of the bladder wall through the urethral opening following the operation. She was eager to have anything done which would relieve her of the discomfort of the continual dribbling of the urine. In her case I made an opening into the rectum from the vagina just above the internal sphincter about an inch and a half in length and one inch in

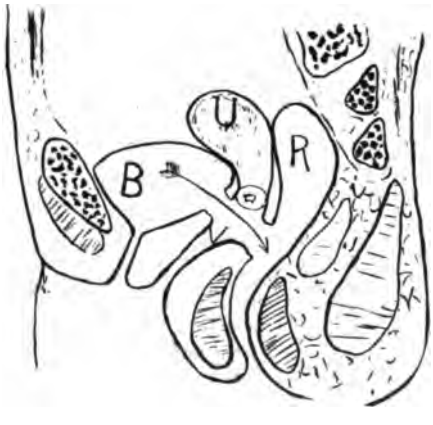

Fig. 3. Opening made through rectovaginal septum.

width, finishing this operation by closing the urethral opening and the vaginal orifice. The operation was a complete success and made the patient very comfortable. She held the urine in the rectum for three or four hours without any rectal irritation. She was perfectly comfortable for seven or eight years until her death from malignant disease of the cecum.

CASE 3. This patient was operated upon in the University Clinic, during my absence, by Dr. Cummings. The patient was a woman of 65 who had extensive sloughing of the bladder following a vaginal hysterectomy. There was a large mass of everted bladder mucosa in the vagina and the ureteral openings were so near the edge of the opening as to preclude closure of the fistula. The result in this case after a number of operations has not been entirely satisfactory since it has not been possible to completely close the vagina, a small opening persisting near the site of the urethra, through which a small amount of urine escapes. While not a perfect result, the patient is quite satisfied when she compares her present condition with what she suffered prior to the operation.

CASE 4. The last case is that of a woman of 38 who was operated upon in the Clinic in February, 1916. The injury to the bladder

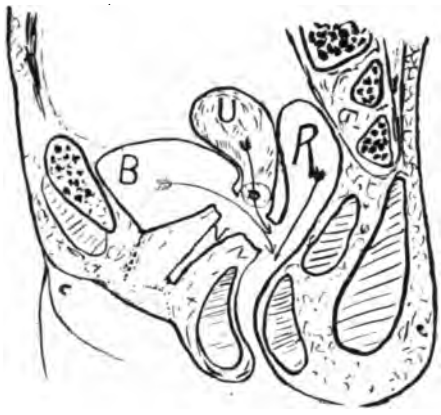

Fig. 4. Vesicovaginal and rectovaginal fistulae. Closure of the vagina (Colpocleisis). Passage of urine, menstrual blood and feces through anus.

occurred in November, 1915 following an instrumental delivery at her sixth pregnancy. Upon entrance to the Hospital she had lost fifty pounds and was suffering frightfully from the irritation caused by the incontinence.

Examination under ether showed the vagina occluded by dense adhesions, not a trace of the cervix to be felt or seen. There was absolutely no give to the vaginal walls and an attempt to loosen the dense adhesions about the bladder opening, which was as large as the thumb, completely failed. At a subsequent operation colpocleisis with the formation of a rectovaginal opening was performed. The operation was successful except for a small opening in the colpocleisis wound which healed before the patient left the Hospital.

I had told the patient that she would have to have a final operation for removal of the ovaries to stop menstruation since no cervix or cervical opening had been found on the previous operation. Naturally dreading any further surgery she was delighted to report to me just before she left the Hospital that her menstruation had come on, as she was voiding urine,feces, and blood by way of the anal sphincter. Naturally, I told her to wait and see what would follow. I heard from her recently and she is in the best of health and is perfectly satisfied with the result of the operation. Time alone will show whether the ureters will become infected from the rectal opening, although reasoning from other cases where the colon bacillus can gain access to the uterus, I do not expect infection will occur.

I have in preparation an extensive paper upon this far from ideal surgical procedure but one that gives great relief to women who otherwise would be constant sufferers.

DISCUSSION.

DR. FREDERIC M. LOOMIS: This operation is, of course, not a matter of choice, but a last resort, yet it illustrates very well that in almost any surgical condition there is at least one way out. The most obvious criticism is that infection of the bladder, and thence ureteral infection and infection of the pelvis of the kidney might follow. As a matter of fact this does not occur. In the cases on record there is no ascending infection if the bladder is not disturbed. It seems to us that the fecal matter does not go into the vagina to a very great extent. The samples that I drew from this patient contained urine but she has passed nearly solid fecal matter. She did not have diarrhea. The results of these two or three cases I have seen were very happy and have not interfered very much after all with marital relations which were practically impossible under preceding conditions, the vagina being excessively tender, irritable and covered with urine.

DR. PETERSON: I may add that the ureters are not infected after this operation because the ureteral openings into the bladder are not interfered with. Some fifteen years ago I performed a number of experiments on transplantation of the ureters into the bowel. Wherever the ureters were cut across and transplanted into the bowel, infection always occurred although a number of dogs recovered from the pyelonephritis. On the other hand, in transplantation of the vesical trigone without injury to the ureteral openings, infection did not take place. That is the explanation of why the infection does not take place in the cases reported.

1. A CASE OF CARCINOMA OF THE PANCREAS.

2. A CASE OF CARCINOMA OR LUES OF THE STOMACH.

HARRY B. SCHMIDT, M.D.
(From the Clinic of Internal Medicine, University Hospital, Ann Arbor, Michigan).

CASE 1. This patient, Mr. B. S., entered the Medical Clinic July 3, 1916, complaining of weakness and a large tender mass in the right upper abdomen. He is 25 years of age, married and a farmer by occupation. His family and personal history are negative.

On May 30, 1916, at night, after working with jackscrews and doing heavy lifting all day, he awoke in a drenching sweat. He complained all the next day of sharp jerking pain in the right lower abdomen and soreness all over the right abdomen. However, he continued to work. The following week he entered the hospital at Hastings, where he was in bed for twelve days. At this time he was very weak. There was a hard tender mass in the right upper abdomen, which has gradually grown toward the epigastrium. On June 26, 1916, the patient went home and remained in bed until he came to the Hospital. He has had no headaches nor cough and has never been jaundiced. There has been no dyspnea and he has never vomited, but has a very poor appetite; the bowels are negative and there are no night sweats. For some time, he has had a fever. His best weight is 165 pounds. At present he weighs 125 pounds. His blood pressure is normal. Examination of the blood shows 3,230,000 red cells, 18,200 whites, and 52 per cent. hemoglobin and 81 per cent. polymorphonuclears (differential count). The sputum, stools, and urine are negative. Stomach examinations showed nothing returned following a shredded wheat breakfast. X-ray examination of the abdomen showed nothing in particular except an enormous enlargement of the liver. While the patient was in the Hospital his temperature (remittent type) ranged from 99 to 102.8°. The pulse rate was correspondingly high although the respirations were normal.

On examination nothing was found with the exception of considerable emaciation, moderate anemia, and a mass extending from the level of the left rib five fingerbreadths below the costal margin on the right side. This dulness, corresponding to the liver, could be palpated in the abdomen, the edge being perfectly smooth and rounded. The surface of the liver was everywhere smooth. On percussion the diaphragm was found rather high in the back and the right lung border did not move well. There was a definite widening of the intercostal angle on the right side. This sign has been reported by Hoover to be due to pressure below pushing the diaphragm upward. There was marked muscle spasm and tenderness in the right upper abdomen. A diagnosis of suppurative peritonitis probably from an acute appendicitis was made with a possibility of pus below the diaphragm pushing the liver downward. The patient was explored on July 8 in the Surgical Clinic. The liver was found enormously enlarged, studded with numerous firm white nodules, presumably carcinomatous. The pancreas were enlarged, hard and nodular and a few enlarged glands were palpated about the pancreas. A nodule was removed from the liver for pathologic examination. The pathologic diagnosis was secondary carcinoma of the liver.

CASE 2. A case of either carcinoma or lues of the stomach.

Mr. R. L., aged 26, married, entered the Hospital July 3, 1916. His chief complaint is more or less continuous pain in the left epigastrium. The family history was negative. At the age of sixteen he entered the navy, contracted malaria in Panama and was treated for same at the naval hospital. He had gonorrhea at the age of 17. He denies syphilis. His wife is living and in good health. From September to October, 1915, he was treated for gastric ulcer. February 25, 1916, he contracted pleurisy which lasted until the latter part of April. His present illness began in April, 1916, with a dull aching pain, which had a tendency to make the patient nauseated. He sleeps poorly and vomits his meals almost immediately after eating. He has never noticed any coffee ground vomitus. His stools are constipated and dark. For the past four months he has had drenching night sweats which come on early in the morning and last a short time but are unaccompanied by chills. At the time the patient was treated for gastric ulcer, he spat blood following a vomiting attack. He has had no cough and there has been no sputum. He feels very weak and has lost forty pounds in weight. The temperature (remittent type) ranges from 99 to 103°. There has been no jaundice but the patient is pale and emaciated. The heart and chest are negative.. There is a light fulness in the left epigastrium with marked muscle spasm and tenderness and signs of counter-irritation. An indefinite irregular mass can be felt to descend during inspiration in the left

epigastrium. The spleen cannot be made out. The liver, apparently, is not enlarged. The urine and blood pressure are normal. Shredded wheat breakfast,removed in fifty minutes, shows an achlorhydria but is otherwise normal. The stool is negative. The blood shows 3,200,000 reds, 8,200 whites and 55 per cent. hemoglobin. There are 78 per cent. polymorphonuclears with an occasional myelocyte. The Wassermann reaction is negative. An X-ray examination of the chest is negative. The X-ray report on the gastrointestinal tract is very interesting. (I have some of the plates here for inspection). The diagnosis by the roentgenologist is cancer or lues, with a suggestion that at his age the latter diagnosis is probably the true one.

The interesting points in these two cases are that the patients are young and approximately the same age. They both have a high remittent temperature with leucocytosis. We were misled as to the diagnosis of the first case on account of age, temperature, leucocytosis and the acuteness of the illness. In the second case, while the patient has not been so acutely ill, there has been continuous high, remittent temperature with a leucocytosis and pain in the abdomen. The X-ray plate shows a great defect in the stomach, which is probably carcinomatous.

While carcinoma has been reported even in infants, it is generally acknowledged that it is very rare in the young, especially in those below thirty years of age. This type of temperature in carcinoma is rarer still. The first author to emphasize the appearance of temperature in cancer was Wunderlich in 1870, who stated that fever in cancer was rare, that the temperature was usually normal or subnormal but that fever might occur in the later stages of the disease. He also remarked that fever was present (intermittent, in some cases in the early stages of the disease and that its presence indicated a rapidly fatal course. Nothnagel has considered that fever was a symptom of cancer itself and Osler and Rolleston are of the same opinion.

Freudweiler has made a very complete study of fever in malignant disease. He examined case histories of 475 patients in which the diagnosis was made with certainty. There were 265 cases of cancer of the stomach and thirty-eight cases of cancer of the liver and gallbladder. Other cases covered almost all organs of the body. He classified these cases according to the type of fever present. The first were those with continuous temperatures, second with an intermittent temperature, third those with a malarial type, and fourth those with isolated or short periods of temperature of less than three days duration. There were 127 cases of uncomplicated carcinoma with fever. Of the 265 cases of cancer of the stomach, 26 per cent. had fever. Of the twenty-eight cases of cancer of the liver or gallbladder, seventeen cases or 45 per cent. had fever.

With 127 cases of uncomplicated carcinoma, he found that 1½ per cent. had continuous fever, a little over 10 per cent. had a remittent or intermittent type of fever, 3.5 per cent. had a malarial type of fever and that 9.3 per cent. had an occasional temperature of less than three days duration. Of the entire number of cases 24 per cent. of the uncomplicated carcinomata have a temperature due to the carcinoma itself. In the light of recent discoveries this temperature in all probability is due to protein poisoning. Some one has called attention to the fact that temperature may be of common occurrence in carcinoma of young people but I can find nothing in the literature to confirm this statement.

DISCUSSION.

Dr. Reuben Peterson: The question of temperature in connection with carcinoma in various parts of the body is exceedingly interesting because of its possible importance in differential diagnosis. Temperature is most commonly seen in connection with carcinoma of the uterus, both of the body and cervix. However, this is rather outside of the question under discussion since here we have to do with a mixed infection due to tissue necrosis and subsequent absorption through the vaginal tract. In fact any carcinoma of the mucous membrane, exposed to the outside air, like carcinoma of the stomach or rectum, may be the habitat of a variety of organisms which may give rise to fever.

Carcinoma of the ovary is not uncommonly accompanied by fever which at times may be pretty high, as much as 101 to 102°. Since carcinoma of the ovary may occur in young people, young women under thirty, and is always accompanied by loss of flesh and strength, it may on account of fever, be confused with tuberculous peritonitis; especially confusing may it be since in both conditions there may be ascites.

Dr. Udo J. Wile: Having arrived late, I did not have the pleasure of hearing the reports of Dr. Schmidt's cases, but I know something about them, as he has talked over the details of the cases with me. Dr. Peterson's point as to the age of carcinoma patients and the relative value of age with regard to the diagnosis of them should be emphasized. More and more we are getting away, I think, in all forms of carcinoma from the so-called carcinoma age. I have seen carcinoma in a man of 19. This was a case of epithelioma. Certain forms of malignant neoplasmata occur at even an earlier age than that, such as the endotheliomata.

As to the occurrence of fever, the point of considerable interest lies in the occasional association of ulcerative infections in carcinoma and the asso-

ciated fever from absorption. I recall a case of a patient who was dying from carcinoma of the pharynx secondary to a large gummous ulcer. The extensive involvement of a distinctly phlegmonous nature in the side of the neck gave rise to a typical picture of sepsis. Of the incidence of fever in carcinoma of the stomach, I have no knowledge.

A CASE OF LEAD PALSY OF THE UPPER ARM TYPE.

CARL D. CAMP, M.D.
(From the Neurologic Clinic, University Hospital, Ann Arbor, Michigan).

The case that I have to report is that of a man, aged 34, a carriage painter, who came to the Hospital because of difficulty in the use of his arms. The family history is unimportant. He said that he had had three attacks of lead poisoning, meaning thereby cramps in the abdomen. The first attack was eight years ago and lasted about three weeks; this attack did not affect the arms. The second attack was five years ago and the third attack was about two years ago. These attacks were all the same. He had never had any other illness.

His difficulty was chiefly in the use of his shoulder muscles. The examination showed that the patient was fairly well nourished although of somewhat spare build. The pupils reacted sluggishly to daylight. Neither eyeball rotated outward as far as it should. The tongue protruded straight, was tremulous, but not atrophied. The teeth were decayed and the gums showed a marked lead line. The biceps and triceps jerks were present and equal on the two sides and the knee jerks were equal and about normal. The Achilles jerks were equal and normal. There was no atrophy of the legs and no tenderness of the nerve trunks. Apparently the nerve head and the retina were edematous, but there was no choked disc. The arteries of the fundi were small and also the veins, but there was no evidence of an inflammatory reaction and no hemorrhages. It was a peculiar looking retina and I have seen it before in cases of chronic lead poisoning. Possibly it is in connection with nephritis, but the urine in this case showed nothing abnormal except a few granular casts. He said that his vision had been affected for a long time. The grip in both hands was weak but there was no localized atrophy in the hands. The ordinary case of lead poisoning shows an atrophy of the interossei muscles and, in its later stages, develops a deformity. There was no wrist drop but extension of the wrists was weak. Flexion of the arms was strong and the supinator longus also contracted strongly. Extension of the arms was very weak and he was totally unable to abduct the arms. The pectoral muscles were not paralyzed. He could raise both shoulders, showing that the trapezii muscles were normal. The paralysis was in the deltoid and triceps muscles only and the muscles affected by the paralysis showed reactions of degeneration to the electric current. It is a rather important diagnostic point that there was no fibrillation of these muscles. We find in some cases of atrophic paralysis of the shoulder, especially in cases of progressive muscular atrophy of the spinal type, that there is a constant fibrillation of all of the muscles.

The unusual feature of the case is the distribution of the palsy. You know that lead palsy is usually characterized by bilateral wrist drop which may begin in the hand most used. In the right-handed painter it is the right hand that is affected first. In the old typesetter it was in the left hand because that was the hand in which he held the heavy stick of type. It is the upper distribution of the musculospiral which is affected in this case rather than the lower distribution.

Another interesting point about this case was that his blood Wassermann was one + positive. In view of the fact that he had a sluggish pupillary light reaction it was thought possible that the palsy might be due to syphilis, but lead poisoning may give a positive Wassermann reaction and the disturbance of the pupillary reflex to light is explained by the effect of the lead upon the retina and optic nerve. That this palsy is not of syphilitic origin is proved by lumbar puncture. The spinal fluid was colorless, contained two cells to the cubic millimeter and was negative to albumin reactions and the Wassermann reaction. We did not test for lead in the urine or feces because such tests in chronic cases of this kind are generally unsatisfactory. One does find, however, in chronic lead palsy changes in the blood, characterized by anemia and peculiar degenerative changes in the red cells. On June 30 this patient had 3,500,000 red cells with 50 per cent. hemoglobin. Blood smears show some basophilic degeneration of the red cells.

DISCUSSION.

DR. QUINTER O. GILBERT: I examined the smear from this man today. There was an increase in the number of whites, I should judge from the smear, about 12,000. Polymorphonuclear cells 44 per cent., eosinophiles 2 per cent., basophiles 1 per cent., (total of 47%) large lymphocytes 18 per cent., small lymphocytes 14 per cent., large mononuclears 15 per cent., transitionals 6 per cent. This shows a marked

decrease in the polymorphonuclear cells and an increase in the mononuclear cells, both in the large mononuclears and transitional group, and also in the lymphocytic group. We don't know the exact significance of the increase in the mononuclears in the blood stream. It is a group of cells which is receiving a considerable amount of attention by hematologists at the present time. They are certainly increased in some of the toxic anemias and in the majority of cases of malignant diseases.

The red cells show the so-called basophilic granules on the average of one cell to about every four or five fields of oil immersion. These cells are not unlike the cells of any other condition of severe anemia. The most striking examples are found in severe cases of pernicious anemia. They are also very common in leukemias and in any other severe anemias. The cells are characterized by irregular granules which stain blue with basophilic dyes. They are considered to come from either nuclear fragmentation or from cellular degeneration products. They occur in lead poisoning but are not specific for this condition. They might be considered as evidence of a toxic condition upon, more especially, the young red cells and are considered by some to be associated with other basophilic properties of the red cells, and indicate youth more than degeneration.

REVIEW OF THE MONTH'S RADIOGRAPHS.

JAMES G. VAN ZWALUWENBURG, M.D.

(From the Clinic of Roentgenology, University Hospital, Ann Arbor, Michigan).

Case of congenital absence of the tibia.

Case of absence of two epiphyses of the tibia.

Case of multiple osteomyelitis and inflammation of the third metacarpal.

Case of supposed Colle's fracture, showing shortening of the fourth metacarpal.

Two cases of anomaly in the lumbosacral region.

Case of heart displaced to the right with portion of the right lung in collapse. Provisional diagnosis atalectasis. Postmortem showed transposition of the great vessels.

Case of unerupted cuspid tooth.

Case of bilateral dislocation of the hip due to double tuberculosis of the hip joints.

Case of periosteal thickening of the shaft of the humerus with destruction of the head—suggestive of lues, probably tbc.

Case of dislocation of the elbow together with comminuted fracture of the epiphyses of both condyles with locked elbow.

Case of tumor of the brain, erosion of the cranial floor.

Case of ossification of the auricle of the ear.

Case of depressed fracture of the skull.

Case of bullet in the tip of the temporal lobe.

Case showing repair of the ribs after resection.

Case of intrathoracic tumor, character unknown.

Postpneumonic process with scar tissue formation and small abscesses.

Case of doubtful shadow in the ureteral region, probably calcified retroperitoneal gland. History of having passed two stones.

Case of injected pelvis of the kidney.

Case of extensive carcinoma of the fundus of the stomach.

Two cases of gastric residue and retention in the upper end of the small bowel. Appendicitis. (See comments below).

Case of high jejunal stasis in an obese woman, no diagnosis.

Case of Lemke: This is the lantern slide of the case which Dr. Schmidt reported, the young man with pain in the left epigastrium. From the radiographic point of view there are only two things which have been known to give this form of picture. The vast majority of them are carcinoma of the stomach and the remainder are syphilis, with this distinction, that in the defect of syphilis the outline is apt to be smoother, the impress is more or less that of a digitation and is generally due to scar tissue formation. In view of this man's age I thought this was highly suggestive of syphilis.

Case showing descent of the splenic flexure with splenic tumor.

Case of safety pin in the esophagus.

Case of screw in the right primary bronchus, later in the left bronchus.

COMMENTS ON TWO CASES OF APPENDICITIS WITH GASTRIC AND HIGH ILIAC RESIDUE.

These two cases of gastric residue are here introduced to illustrate a combination of findings that we have met rather frequently. The development of "syndromes" is rather frowned upon in radiographic circles at the present time, and at best such evidence must be inferior to direct evidence of morphologic changes in the gut. None-the-less, if the study of "syndromes" is going to advance our knowledge of the physiology of digestion we can not afford to neglect their study.

There are two very distinct pictures that we commonly see in appendicitis, the one is that shown here, viz., a six hour gastric residue and

a high distribution of the barium in the small bowel, and the other with pyloric spasm, hyperkinesis, a secretion zone, and a stasis in the terminal ilium. The latter is generally conceded to result from a reflex arising in the appendiceal region, producing motor and secretory changes in the function of the stomach and bowel. The clinician has for a long time recognized the occurrence of a hyperacidity of appendiceal origin.

The inhibition shown in these slides probably rests on a similar basis, but resulting in the opposite effect. A greater degree of inhibition might very easily lead to nausea and vomiting.

Attempts to explain these two contradictory sets of findings lead to pure speculation. We have been entertaining the hypothesis, that the inhibitory reflex is seen principally with inflammatory lesions in the cecal region, while the spasms and hyperacidities occur with mechanical difficulties such as adhesions, kinks, and torsions secondary to inflammations of the appendix, gallbladder and ascendans. In confirmation of this supposition we have seen it in its most marked development in a case of acute appendicitis.

It appears probable that a similar "high residue" occurs with other inflammatory processes in the neighborhood of the small bowel. Whether it depends on peritoneal irritation, or on mucous membrane lesions, whether it occurs with pelvic lesions, are some of the questions that await investigation.

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